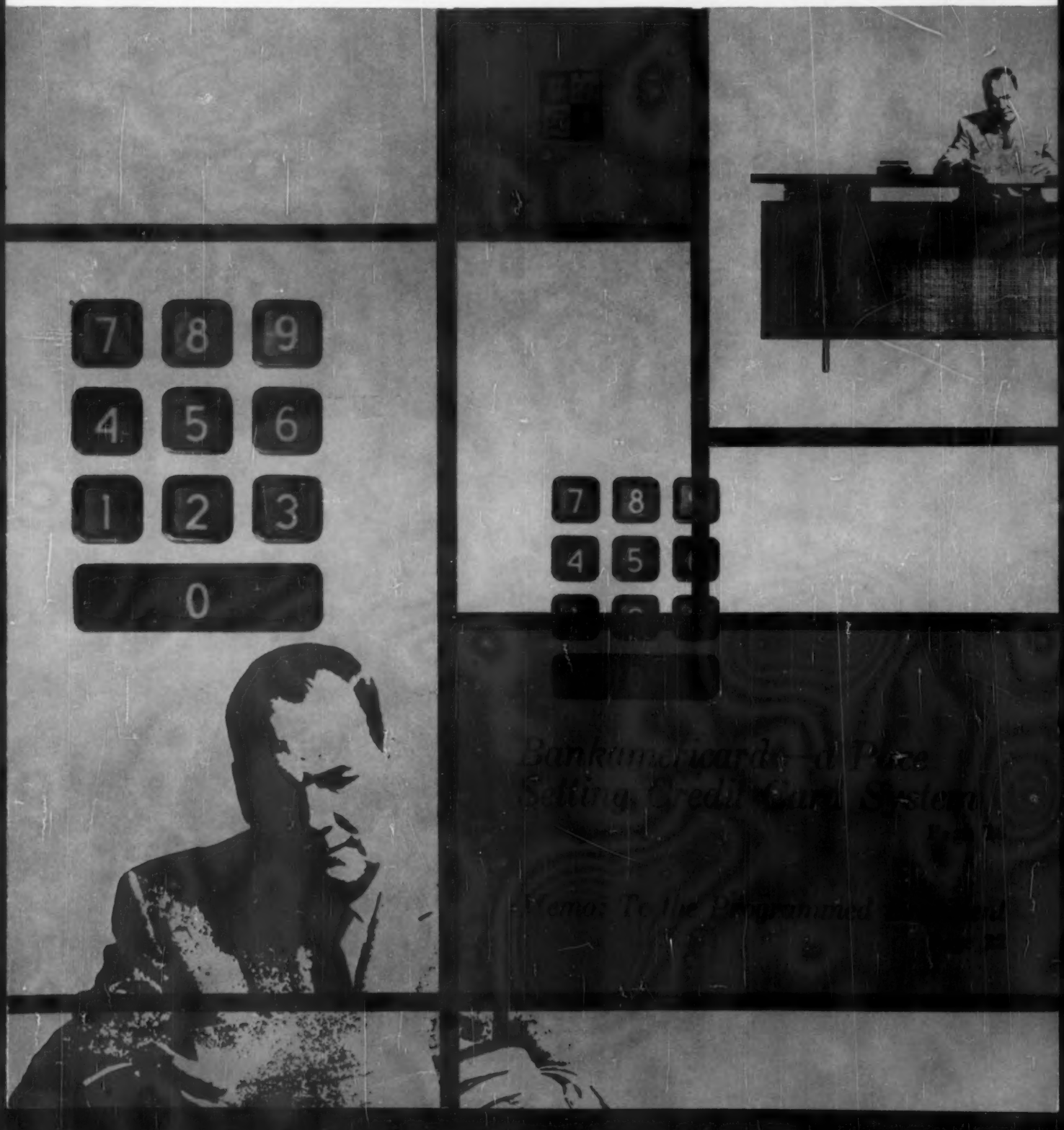
January, 1960

MANAGEMENT *and* BUSINESS AUTOMATION



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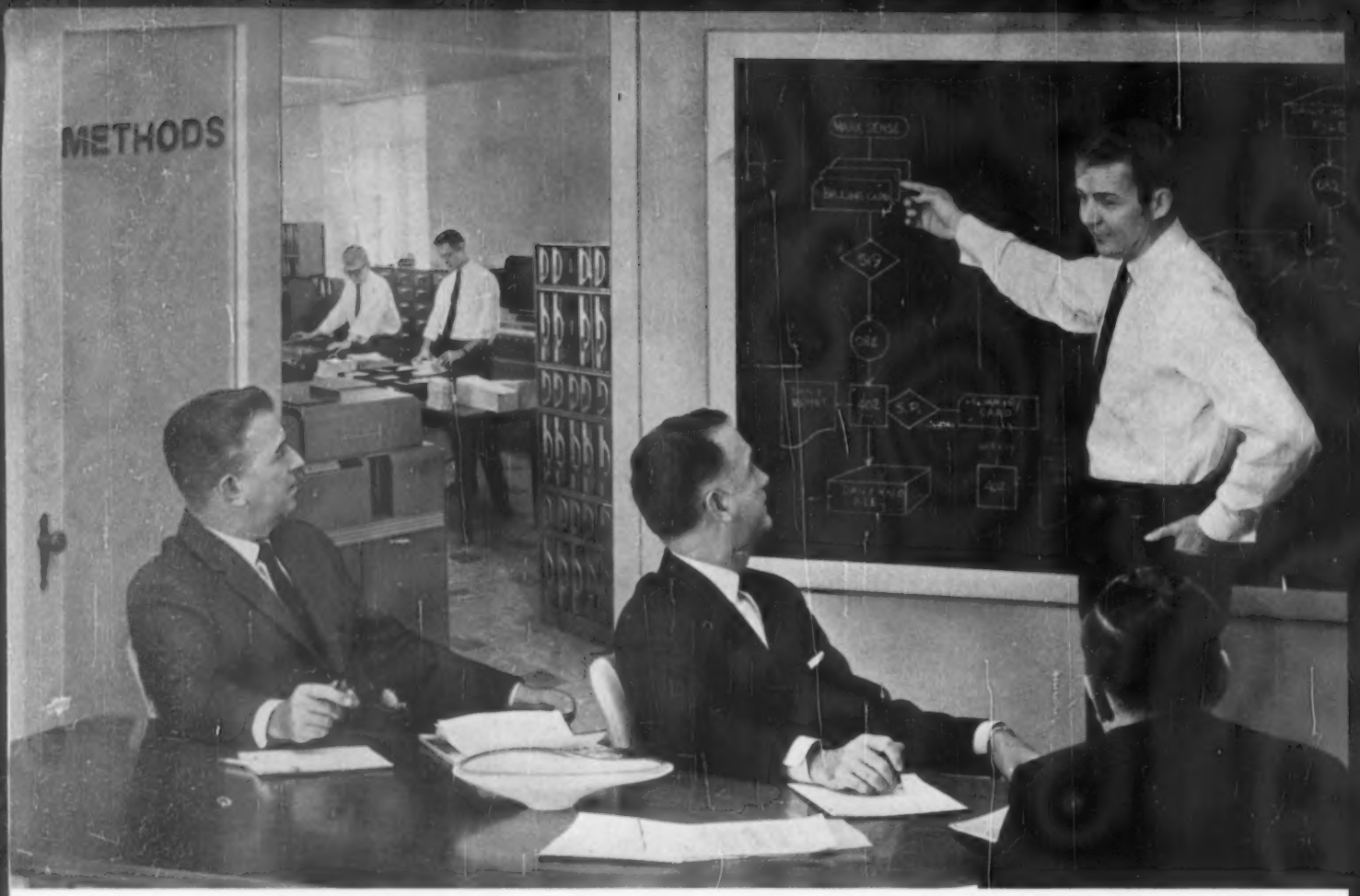
ROYAL McBEE · *data processing division*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

For More Information Circle Reader Service Card No. 1-52



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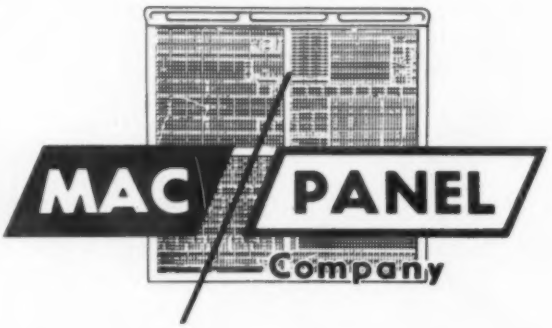

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West Coast Office and Warehouse: San Francisco, California

MANAGEMENT *and* BUSINESS AUTOMATION

January, 1960
Vol. 3, No. 1

New ideas, developments, applications, results, and the human impact of business automation in commerce, industry and government.

18 *Bankamericard—a Sophisticated Credit System for Californians*
By Arnold E. Keller

22 *Memo to the Programmed President*
By Carl E. Osteen

25 *New Honeywell Tape Drive—with 'Vacuum Touch'*
An MBA Product Preview

28 *SKF Tightens Control over Production Paperwork*

30 *Navy Attacks Paperwork Costs on a World-wide Front*

34 *A Comprehensive Look at High-speed Printout*
By Norman Statland

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Scanning the Issue...

Few people are aware that the Bank of America's unique credit card system—which is bringing convenient credit to some two million California families—is an economic reality only because of the bank's development and use of new business automation and communication techniques. For the entire story of "America's most modern credit card system"—told for the first time—read **Bankamericard—a Sophisticated Credit System for Californians** on page 18 . . . Carl Osteen, systems manager for the New York Times, cautions top executives about an unwieldly forms control program in **Memo to the Programmed President,** page 22. He may find, in reality, that another paperwork empire is in the making. . . The latest developments—and a look at the future—are provided in **A Comprehensive Look at High-speed Printout,** page 34, which indicates that the manufacturers are rapidly bringing data output speeds to a point where they compare favorably with the internal speeds of most computer systems. . . There are two stories pointing up the military's progress in paperwork wars. One, the **Navy Attacks Paperwork Costs on a Worldwide Front,** page 39, reveals a system of source data automation designed to convert data into machine language at the point of origin. The other, on page 8, is a news feature disclosing a new computer system installed at the Norfolk Naval Supply Base, which will control the huge base's 500,000-item inventory. . . This month is rounded out with two interesting installation articles. One shows how bookkeeping machines, coupled with keypunches, enables the Koppers Co. to control accounts payable for 70 plants in one central office (page 38). The other covers an unusual application for duplicating machines which create some 14,000 pieces of paper daily to provide production control for SKF Industries, Inc. This appears on page 28.

Absolutely! Asynchronous is one of the most important words in data processing. It means faster computing and freedom from obsolescence. The Philco 2000 is the only asynchronous computer commercially available. It progresses from one operation to another without the time lag that occurs in all clock timed systems . . processes more work in any given period. Asynchronous operation also permits updating or expanding the system at any time, without changing design or disrupting existing programs. Get the full story on the Philco 2000. . . first in fully transistorized data processing . . . and the only asynchronous system available to business.

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Rear Admiral Hugh C. Haynsworth, Jr., commanding officer of Norfolk Naval Supply Center, activates the center's newly installed Burroughs 220 Electronic Data Processing System. With him are Ray R. Eppert, president of the Burroughs Corp. (center) and Rear Admiral A. J. Bourgeois, inspector general of the Supply Corps.

Electronics to Aid Navy Supply Service

An MBA News Feature

THE Norfolk Naval Supply Center, one of the largest supply centers in the world, has installed a Burroughs 220 Electronic Data Processing System to store and maintain the basic records for the center's 575,000 stock items.

The center ships out an average 145,000 tons of supplies monthly to bases and fleets in the Atlantic and Mediterranean oceans and to other customers around the world. It also provides comprehensive supply support for such high priority projects as the Polaris Navy Ballistic Missile Program.

The 220 will serve as the nerve center for this vital operation, providing immediate random access to the up-to-the-minute status of supply records, which were formerly maintained on individual punched cards. Total inventory to be controlled by the system is in excess of $600 million.

Commenting on the new installation, Rear Admiral Hugh C. Haynsworth, Jr., Commanding Officer at the Center said: "The Burroughs 220 will supply a much-needed military advantage in terms of logistics support; including electronic speed, superhuman accuracy, and precise control."

In conjunction with the new system, the center has activated a "telephone inquiry" unit to process urgent information inquiries regarding items of supply. The inquiries, which come from center customers, technical bureaus, supply demand control points (inventory managers) and local operating personnel, are received by one of six telephone inquiry clerks. The clerk fills out an interrogation form which includes the EDP system "search key" (Federal Item Identification Number) of the item under interrogation.

This form is passed to a Friden Flexowriter operator who types the search key number, at the same time recording it in punched paper tape. This tape is fed into a Burroughs Photoreader.

The Photoreader scans the paper tape and transmits a signal to the data processor. Upon recognition of the signal, the processor activates the internally-stored search program to seek out the particular item record required.

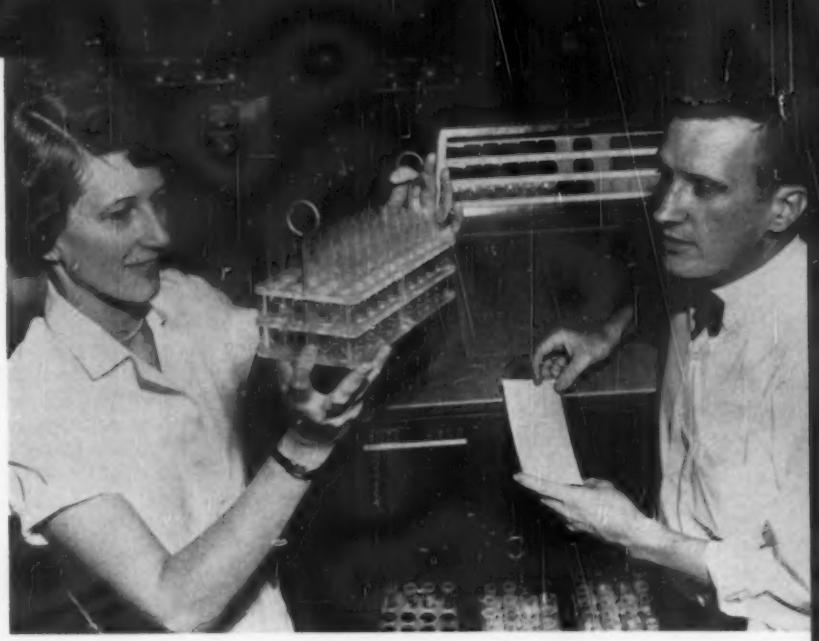
The system in action: Inquiries regarding stock status are received by one of six telephone inquiry clerks (foreground) who fill out interrogation form, using the EDP system Search Key—Federal Item Identification Number—of the items under interrogation. The inquiry is passed to Friden Flexowriter operator who prepares paper tape which is transmitted to the 220 system by a Burroughs Photoreader. Answer to inquiry is printed out on an IBM 407 and returned to inquiry clerk. Entire cycle has been timed in 73.4 seconds.

The answer to the inquiry is immediately printed out on an IBM 407 tabulating machine. If the item is carried in stock, the necessary stock status information will be indicated. If the item is not carried, the legend "NC" (Not Carried) will be shown. The print-out form is passed to the telephone inquiry clerk who relates appropriate information to the person inquiring. The entire cycle, including the original telephone conversation with the inquirer, the search and the return of the answer to the clerk requires an estimated 73.4 seconds.

The Burroughs 220 installation is the result of a five-year study involving center personnel, members of the Navy Management Office and the Department of Defense. In addition to Stock Inventory Control, the new system has been programmed to handle Financial Inventory Control, and Integrated Personnel Services, which includes pay, leave, savings bonds and labor cost accounting functions of the center's 5,000 civilian payroll. ■

The 220 system, housed in a new, modern EDP machine room, controls the center's 575,000-item inventory.

Microbiological Testing Speeded By APR System



Dorothy M. Hucke and Charles H. Roche developed the system to determine the potency of antibiotic drugs on bacteria.

An MBA News Feature

A SUCCESSFUL application of automation in microbiological testing is now in operation at the biological control laboratories of Charles Pfizer & Co., Inc. A new, high-speed automatic production recording system (IBM-APR 9600) is utilized in conjunction with a 650 computer to calculate laboratory data in six minutes—a job which previously required 30 hours of work by technicians.

This automated turbidimetric assay system was developed by Dorothy M. Hucke, a Pfizer biostatistician, and Charles H. Roche of the drug and chemical company's electronic research department. Turbidimetric assays determine the potency of antibiotics and other drugs. Tests are based on the fact that bacteria, grown in test tube solutions, cause a cloudiness or turbidity in the solutions.

Adding an antibiotic to the test tube inhibits the growth of the bacteria and reduces this turbidity. This is where automation steps in. The difference in degree of turbidity is measured by a Bausch & Lomb spectrophotometer—a photoelectric device which records the amount of light passing through each sample. All manual operations and human calculations are now performed swiftly and accurately by electronics.

"We have replaced the 43 pieces of information previously recorded for every sample on five different data sheets by only 12 pieces of information entered on a punched card and automatically listed on one data sheet," Miss Hucke stated. "Common errors found in computing sample potencies are eliminated," she added.

Without stopping for human analysis, the turbidity readings and other important data are fed from the spectrophotometer and automatically

Light passing through a spectrophotometer is converted to digital pulse by a digital voltmeter and this, in turn, punches card.

entered on punched cards which are then processed by the computer.

Miss Hucke points out that the automated data processing equipment had rid the staff of the fear of human error and given them a deeper sense of confidence in their test results. More important, she pointed out, the system has extricated supervisory personnel from under a mountain of paperwork and freed them to put their time and skills to better uses.

A similar system is now under consideration for plate diffusion assays, another method of gauging the strength of antibiotics and other drugs. New electronic equipment is also being installed for the collating of results of pharmacology, sterility and potency testing.

. . . *from the*

Publisher's Desk

LIKE a number of others these days, we can't resist commenting on the current furor in the television and radio broadcasting industries. Our interest in this area lies with the words "Editorial Responsibility" . . . a subject dear to our hearts, and we hope, to our readers.

Initially, it was Charlie Van Doren who was the whipping boy. Next it was the disk jockey and payola. Currently, it is television in general. By the time Congress reconvenes, it will be someone else.

But through it all, no one seems able to place the blame on any one person or persons. When you can't find anyone to blame, you blame the system. What, then, is wrong with the television system?

We frankly are not authorities about television. But it seems pretty clear that the main thing wrong with television is the almost complete lack of editorial authority and responsibility. The term "editorial" is most generally applied to printed publications, but the obvious need for some kind of editorial control and editorial balance is most apparent in the broadcasting industry today.

For example, how would you regard a publication . . . either a business or general magazine . . . that said to its advertisers, "Why don't you take over the whole book, lock, stock and barrel? We'll print whatever you send us, just as you give it to us, so long as it doesn't get us into jail." Yet, in essence, that is exactly what TV has done.

Many years ago, the publishing business had similar problems. It learned about editorial responsibility the hard way. Reputable publishers constantly are on guard against any intrusion by their advertisers into the editorial pages. Such publishers will note quickly any attempt to influence or control editorial content and policy.

Farsighted publishers go further than that. Through constant research, they seek to interpret the changing needs and interests of their readers in order to serve them better. In this way, the advertisers benefit and a healthy respect is created for the material which the editors choose to print.

From the outset 15 months ago, MBA's editors have firmly established these precepts in the minds of our advertisers. And we are glad to report that, to date, there has been very little pressure exerted for special treatment from our manufacturer friends. The result is an editorial product which justifies your confidence and which, over the years, will contribute to the over-all advancement of business automation.

Charles W. Gilbert

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Letters

Dear Sir:

One of your interesting and challenging sample tests which accompanied the article "A Program for Selecting Data Processing Personnel" turned out to be slightly frustrating as well.

Answers to questions number 3 and 4 on Sample Test I as shown are obviously incorrect as no stretch of the imagination could get those pieces to fit into "D" and "C", respectively. It is the consensus of our department that the answers should be 3-C and 4-E.

James Warren
Systems Analyst
Kawneer Company
Niles, Mich.

Ed. Note—You're right, we're wrong! To Mr. Warren and the many other readers who wrote, phoned and wired their anxieties, our apologies for having added an extra challenge to their reasoning. The error has been traced to a proofreader who flunked psychology —among other things.

Dear Sir:

I should like to compliment you on the splendid editorial, "Why Overlook the Systems Man?" in your October issue. You have brought into sharp focus a practice that appears to me to be becoming more prevalent each year. Just why "management" does not recognize the realistic factors involved in their current practice of calling upon "specialists" or management consultants is difficult to understand.

It has been my observation that many an outstanding systems man has become discontented with the lack of authority, responsibility and recognition given him by his employer. Consequently, he leaves to go with a firm of consultants and ultimately becomes the "specialist" to which management is now willing to pay an exhorbitantly high fee in comparison to what they would pay the same man to carry him on their payroll as an employee.

Harry G. McDowell
Deputy Director of Finance
City of Philadelphia
Philadelphia, Pa.

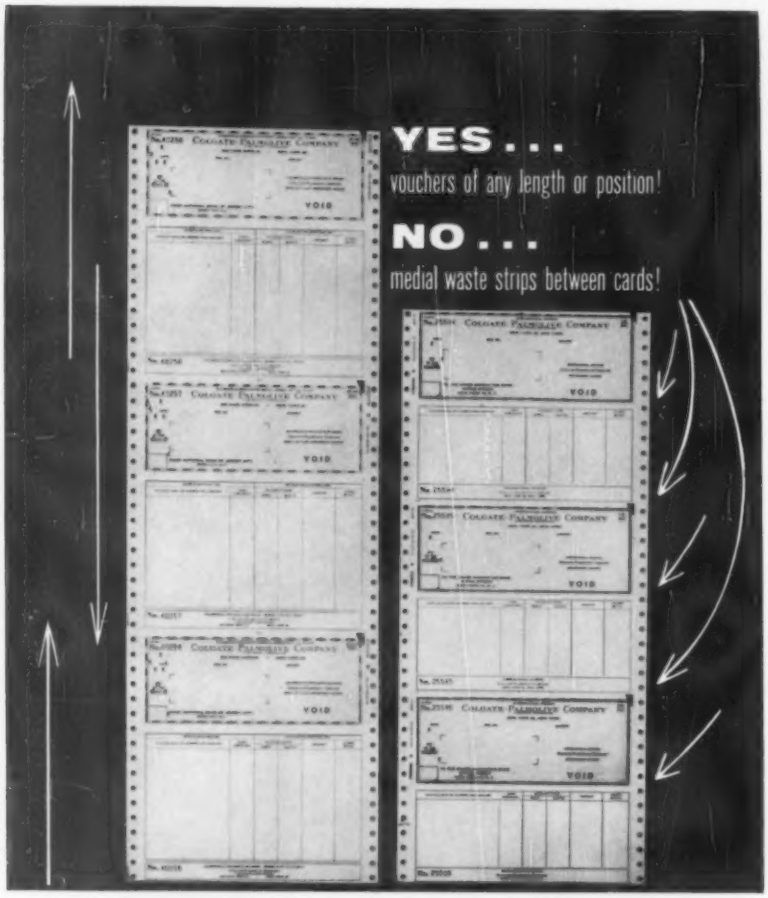
Dear Sir:

Your editorial "Why Overlook the Systems Man?" is, in my opinion, the type of editorial that should have as wide a circulation as possible.

As Publicity and Publication Chairman of my chapter of the Systems and Procedures Association, I would like your permission to reprint the article.

S. B. Cliff
Systems Analyst
Personal Products Corp.
Milltown, N.J.

Address letters to the Editor, MANAGEMENT and BUSINESS AUTOMATION, 600 W. Jackson, Chicago 6, Ill.



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For More Information Circle Reader Service Card No. 1-58

The MBA 1959 Editorial Index

This is a complete chronological index of articles appearing in the Oct./58 and all 1959 issues of MBA. A cross index of articles by application appears on the next page.

October, 1958

16 **James Hoffa Eyes the Office Worker,** by Arnold E. Keller. Using automation as a wedge, Hoffa plans to put his foot in the office door.

20 **Boston's First National Goes Automated—With Teamwork.** The largest electronic banking system.

26 **From Abacus to Electronic Computers.** The story of automation, past and present.

32 **Making Copies.** Duplicating, reproducing and copying machines and their differences.

January, 1959

14 **American Airlines Automates Reservations for the Jet Age,** by Arnold E. Keller. Data processing network provides reservation service to eight million passengers.

19 **Westinghouse Automates Engineering Drawings.** Microfilm and punched cards take over a million tracings at the East Pittsburgh division.

28 **'Invoice Inside'—The Magic of Push-Button Inventory Control,** by Eugene Whitmore. Automated invoice ends merchandise delays caused by paperwork confusion.

34 **Nine Ways to Avoid a Headache.** Planning a home for automated equipment is a job for experts.

38 **You Can't Automate a 'Mess'—First You Have to Get Organized,** by Harold Wood.

February, 1959

14 **Automation Is a Job for Top Management,** by Gen. Clinton F. Robinson. The "total systems" concept at Carborundum is a result of executive decisions and action.

20 **EMC—A New Way Out of Inventory Problems.** Jordan Marsh employs Electronic Merchandise Control to get accurate daily records of movement of goods.

26 **Chicago Sun-Times Sets Pace With Automated Inter-Com System.** Pneumatic tube system speeds communications between departments in an ultra-modern newspaper plant.

29 **Automatic Programming—Fact or Fancy?,** by H. N. Laden. Tackling a tough problem of cutting cost and delays in preparing computers for large business applications.

36 **The Computer's Job Is Guidance.** Missile research at Cape Canaveral and White Sands rely on information supplied by scientific computers.

March, 1959

14 **Major Breakthrough in Paper Processing,** by Arnold E. Keller. MICR opens the door to automatic, high-speed data handling.

21 **Picking the Computer's Boss—A Decision of Import,** by D. Ronald Daniel. Choosing the right man to head the computer program and determining the location of the computer staff in the organization.

28 **Punched Cards Save a Small Texas Business,** by Eugene Whitmore. Integrated accounting and merchandising helps a wholesale grocery operation compete with the giants.

34 **Computer Will Complete Corning's Nation-wide Data System.** Owens-Corning plants and offices are linked by a Teletypewriter system which will be integrated with a computer.

April, 1959

14 **Uncle Sam Moves a Paper Mountain,** by Arnold E. Keller. An inside view of one of the massive Internal Revenue Service's punched card installations.

18 **Electronic Economy in a Small Office.** Desksize computer cuts billing time by 70 percent for a Michigan automobile transporting firm.

22 **A Major Weapon in Cost Cutting.** Keysort systems provide the Rockwell Mfg. Co. with pin-point control over daily labor and operation costs.

28 **Mr. Babbage's Great Calculating Engine.** A general purpose computer was designed for punched cards 100 years ago.

30 **Automatic Control of Consignment Inventory.** Reynolds Metals Co. uses unit ticket systems to control consignment inventory.

May, 1959

14 **Magnetic Tape Pays A.T.&T. Dividends,** by Eugene Whitmore. Records governing 1,600,000 stockholders were converted from ledger-posting to a magnetic tape computer system.

18 **'Car-Fax' Brings a New Era in Railroading,** by Arnold E. Keller. Chicago & Northwestern Railroad has combined electronics with integrated data processing to inaugurate a new, high-speed freight control system.

26 **Computer in the Cornfield,** by Robert Minor. A small computer helps grow and deliver hybrid corn for Illinois seed company.

30 **Three-way Tape Exchange Cuts Paper Work.** Railroads exchange tape outputs to settle inter-line freight accounts.

June, 1959

12 **A Survey of Machine Accounting Salaries.** An MBA survey reveals machine accounting personnel salaries in 21 major U.S. cities.

17 **A Complete Automation System Delivers the Goods,** by Louis M. Cottin. EDP, closed-circuit TV and two-way radio combine to speed deliveries for Yale Transport Corp.

20 **Relécom—a New Concept in Management Control,** by M. W. Anderson and T. L. Vallely, Jr. A system of the future which will supply instant information from the computer center to the executive's desk.

28 **A Case of Missing Management,** by Arnold E. Keller. Exploring the lack of management responsibility in machine accounting departments.

July, 1959

6 **Computer 'Clerks' Help to Control Air Traffic.** A file computer eases the paper work problem.

8 **Carte Blanche—The Automated Credit Card,** by Arnold E. Keller. Total automation is the key to Hilton Credit Corp.'s effective, new low-cost credit card plan.

13 **Fidelity's Move to Electronic Banking,** by John A. Cost. Fidelity-Philadelphia Trust Co. automates with the RCA 501.

18 **Showcase Your Computer!** by Eugene Whitmore. Merrill Lynch, Pierce, Fenner & Smith make customers aware of the computer's service value.

20 **Files and Business Automation,** by Robert Minor. New concepts in housing records bring speed, efficiency and operator-comfort to filing operations.

34 **Breaking the Bottleneck in Order Processing.** A copying system cuts time and costs in purchasing for the A. O. Smith Co. in Milwaukee.

August, 1959

14 **Nation's Lifeline: Direct Wire.** Wire and cable link data processing systems to provide management with far-flung control over operations.

18 **The Wave of Tomorrow.** Microwave relay promises to be a boon in point-to-point communications for business.

22 **Closed-Circuit TV takes Center Stage.** Television moves out of the "gimmick" class into sound business applications.

26 **Business Goes Over the Air.** Two-way radio connects field and plant operations with headquarters.

31 **Intercommunications Systems Improve Cost Control.** Solving the problems of delay in gathering time and cost data.

34 **Centralized Dictation—A 'System' Secretary.** Automated stenographic pools are now in use.

36 **High-speed Tubes Carry Paperwork.** The pneumatic tube in business.

September, 1959

14 **Magnetic Ink goes to Work,** by Arnold E. Keller. The Merchandise National Bank makes a leap from non-

automation to Magnetic Ink Character Recognition system.

20 **General Purpose/Custom Built,** by Robert Minor. Evaluating general purpose and special purpose computer systems.

25 **Automatic Writing Speeds Order Processing.** A tape and card file "pool" of prewritten information keeps orders flowing for Minneapolis-Honeywell.

32 **Automation—A 'Redeeming' Factor at S&H.** Automatic data processing controls merchandise levels at 570 "Green Stamp" redemption outlets.

October, 1959

12 **A Computer Pays Off at Farmers Insurance.** Two years of successful, full-scale automation at this giant casualty firm.

17 **Data Processing Offers Added Profits for Small Business,** by Stan Englehardt. Efficient methods of data handling are available to businesses of every size.

22 **Order-Invoice Paperwork Trimmed to a Minimum.** A single typing keeps orders going at B. F. Goodrich Industrial Products Co.

28 **'Keycard' Simplifies Labor Distribution at Norge.** Labor distribution, information determines error proof payroll at Norge.

November, 1959

12 **The Office Manager—An Automation Casualty,** by Bernard Heinrich. The onrush of business automation has swept the office manager from his pedestal, but there is still a place for him and his talents.

16 **Punched Cards Control the Huge 'McIntyre Market.'** A direct mail marketing firm, O. E. McIntyre, Inc., has automated operations to deliver a 36-million-family market to its clients.

22 **'Operation Transition,' a Big Step for Pacific Power & Light.** Jump from key-driven equipment to EDP is successful for western utility.

30 **Big Things Accomplished in a Small 'Tab' Department,** by Eugene Whitmore. Faster inventory turnover, lower capital requirements, better service and more information for by Comet Rice Mills.

December, 1959

6 **Pinpointing the Problems of Data Processing.** Six authorities discuss the major problems of data processing at MBA's Washington Roundtable.

15 **Paper Tape Simplifies Revenue Control.** Michigan trucking firm gets its reports as by-product of customers' accounts receivable.

16 **Internal Recruitment—A Program for Selecting Data Processing Personnel,** by Deborah Blumer. Professional testing can determine if a company already employs personnel qualified to staff an EDP installation.

20 **Selective Addressing by Tab Cards.** P. F. Collier & Son publishers automates label and invoice production.

23 **'Project Turnkey'—Push-Button Post Office of Tomorrow.** The Providence R.I. Post Office incorporates many new devices, and what the future holds in automated mailing.

30 **Magnetic Mail System Speeds Data Handling.** An automatic conveyor system for interoffice mail.

1959 MBA Index by Application

FOLLOWING is an alphabetical cross index of subjects covered in the Oct., 1958 and all 12 issues for 1959.

Accounts Payable — Mar./p.28, Nov./p.30

Accounts Receivable—Mar./p.28, Jul./p.8, Oct./p.17, Nov./p.22, Dec./p.15, Dec./p.20

Airlines—Jan./p.14, Jul./p.6, Oct./p.6

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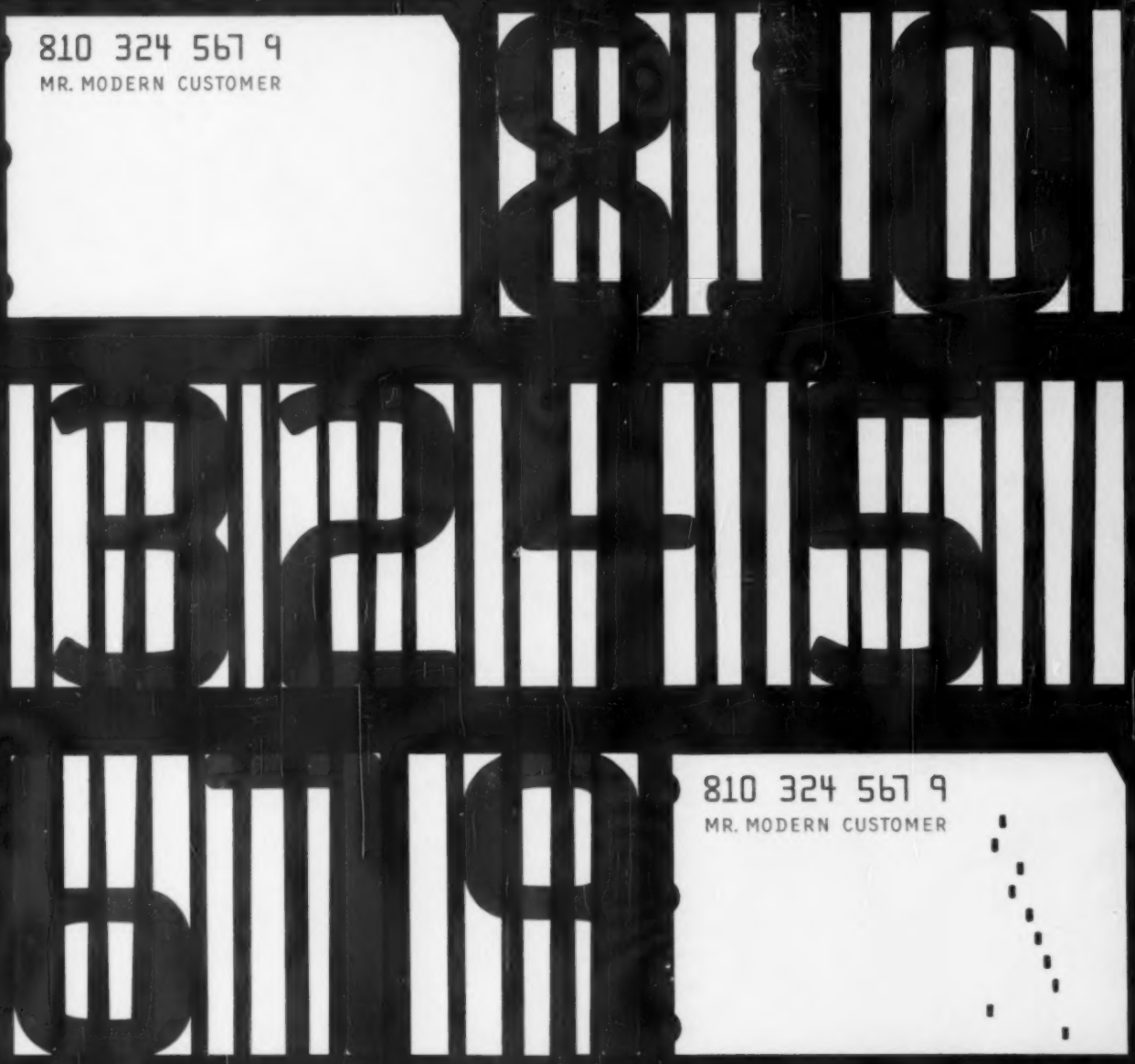
The next MBA Index will appear in the July, 1960 issue



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The Farrington Optical Scanner (familiarly known as the EYE) is the first machine that does automatically what the human eye can do: it reads. Not only that; it also translates what it has read into language that is understood by data processing machines—punched cards, magnetic tape or perforated tape. And it accomplishes these feats with a speed and accuracy that no human eyes and fingers can match.

Take, for example, the credit card shown at the top of this page. The EYE reads the number, digit by digit. Then it punches the number into the card for use in automatic accounting or billing systems; 10,000 cards like this can be processed per hour.

Optical scanning is the most advanced and most versatile means of converting imprinted data into any form for processing. Because the EYE sees, there is no need for special inks or paper. Almost any type face, character, arrangement or length of material is readable.

Wherever you find three or more key-punch operators, you find a likely place for an Optical Scanner. Only Farrington makes it.

Farrington Optical Scanners are now automating data processing for companies like:

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For further information, write the Farrington Manufacturing Company, Needham Heights 94, Mass.

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STAXONSTEEL employs an engineering principle to combine the strength of steel with the economy of corrugated board. The steel supporting frame gives the drawer equal support front, back and sides. For long term economy there is no better record storage drawer than STAXONSTEEL. Five standard stock sizes available.

FREE Catalog and Record Storage Manual.
Write Dept. MBA-1

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Record Storage Specialists Since 1918
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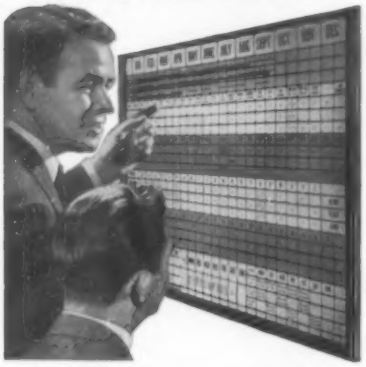
Circle Reader Service Card No. 1-60

How To Get Things Done Better and Faster



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Without Obligation

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GRAPHIC SYSTEMS
Yanceyville, North Carolina
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RANDOM ACCESS

Whither Thou Goest?

"Fears that increasing automation will eventually create widespread unemployment are unfounded, said a report of the International Labor Organization, a U.N. agency, issued yesterday. While there may be declines in some areas of employment, automation, in the long run, will create employment in other areas, the report continued. In the U.S., the number of employed persons increased 25 percent between 1940 and 1950." (From a dispatch in the New York Daily News, Nov. 22)

"A drastic loss of whitecollar jobs as a result of widespread use of office machines was predicted today by the International Labor Organization in a report on the effects of automation in the offices, released by the U.S. agency. Staffs most affected will be those with traditional skills —bookkeepers, filers, accountants and invoicers—as well as semi-skilled employes in routine operations connected with this work, the I.L.O. said.

"Considerable alarm is felt concerning the over-all effect on offices when the use of automated devices becomes more widespread, the report stated." (From a dispatch in the N.Y. Herald Tribune, Nov. 22)

One of the Greats

Electronic computers are one of the three greatest contributions this generation has made to society, ranking with automation and the harnessing of atomic power as a source of energy, says Dr. James Sweeney, director of the Tulane University computer center. Computers are the servants of mankind with which generations of today and tomorrow can open untold vistas to make life better and easier, he said.

Short—But Not Sweet

The Chrysler Corp.'s IBM payroll computer has been "short-naming" employes, according to a complaint by the UAW Local 212.

Calling the situation a "most inhuman condition," the union charges that the machine can only handle 10 letters in a name. This deprives employes with names such as Porolniczak and Crosthwaite of "the rights given at childbirth to carry on the heritage of a proud name."

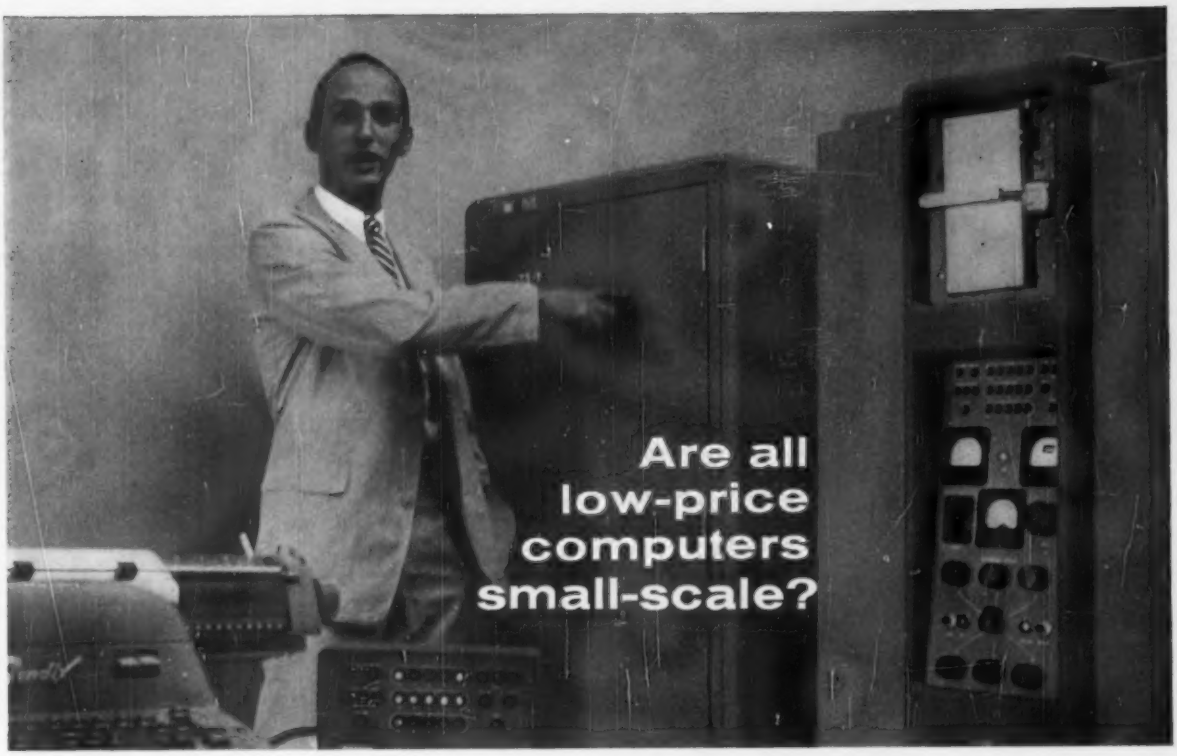
End of the Line

There's good news for the harried husbands who have missed the big TV ball (foot and base) games while sweating out the Saturday afternoon check-out line at the supermarket.

Ronald Segal, special projects engineer for Ramo-Wooldridge Corp. predicts that in the near future the customers will place groceries on a moving counter that will pass them through an electronic machine which will list the price of each item on a tape. The total will be printed on a check issued to the customer, who will then pay it at an automatic machine which will be able to make change—and possibly say "Thank You."

Meantime, the parcels will be sent along an assembly line to a spot where they can be picked up by the customer and taken out to his waiting car.

Mr. Segal did not explain how the automated system would give credit for empty Schlitz bottles.



Answer: All but this one.

Here is a *medium*-scale general purpose digital computer, and the only small-scale thing about it is the price. It's the low-price Bendix G-15.

Part of the remarkable success of the G-15 is due to that low price. One user writes, *". . . the nearest competitor to the G-15 costs five times as much."*

There are many other reasons why hundreds of computer experts have chosen the G-15. Versatility is one. The G-15 is well-equipped to handle all phases of business data processing as well as highly complex scientific and engineering calculations. Also, simplified programming methods allow your present personnel to solve their own problems on the computer.

A broad line of accessories means the G-15 is expandable. As the work increases, you can add magnetic tape units, punched card equipment, and other accessories. Don't forget, however, that the basic G-15, with its photoelectric paper tape reader-punch and electric typewriter, is more than adequate for most problems.

Other features you will like are: true alphanumeric input-output, high internal speed, buffering, large program library and user's exchange group, and fast nation-wide service.

Bendix® Computer

Complete details will be sent upon request. Mention specific problems where the G-15 may be helpful, and we will be glad to advise you.

DIVISION, DEPT. U-14, LOS ANGELES 45, CALIFORNIA

Experienced programmers, sales and service personnel... share our growth. Contact O. P. Staderman, Director of Marketing.

For More Information Circle Reader Service Card No. 1-62

◀ San Francisco "authorization room" where customer credit records are housed in special, punched card files, enabling clerks to provide 20-second service to merchants requesting credit OKs.

The Bank of America reveals the systems story behind its multi-million dollar credit card program.

Bankamericard—a Sophisticated Credit System for Californians

By Arnold E. Keller

OVER two million California families can now enjoy the benefits of "convenient" credit, thanks to Bankamericard, and the Bank of America's effective use of business automation. Three automated control centers, located in Pasadena, San Francisco and Sacramento, and a staff of 400 people are involved in the multi-million dollar program, which Bank of America officials say is the "most modern credit card system in America."

Information for the system is provided by a vast communication network, which links the centers with over 26,000 "merchant" members—the retailers, professional services and service organization people, who honor the credit cards throughout the state. This network, the largest long-distance trunk line ever installed in California, is equivalent to a private telephone hook-up between the centers and members. The members are able to reach a center by calling a local number, even though a long-distance line is involved.

The network is actually the "credit" lifeline of the Bankamericard system. It provides instant contact between the merchants and the credit records of the two-million plus card holders, which are distributed among the three control centers. Pasadena handles the records of some 1.1 million customers, San Francisco has 600,000 and Sacramento 300,000.

Bankamericard is more than just another credit card. "We look upon it as a modern sophisticated way of shopping—not merely a credit venture," says Joseph P. Williams, vice president of Customer Services Research. "It is not an 'easy credit' plan; we don't want people in debt. But with the plan the customer can make all of his monthly purchases and receive only one charge. And as long as he pays his bill within 25 days after receipt, the service costs him absolutely nothing."

One reason for the enthusiastic acceptance of the plan by California merchants is the sliding scale of service charges. While the merchant is charged six percent on all transactions, he receives a quarterly refund based on the total dollar volume during that period. Under this system the service charge to some members is as low as 1.75 percent. The average for a quarter is around 3.7 percent.

Credit by wire

The credit plan got under way September, 1958, with a pilot system in Fresno. Original plans called for eight computer centers to blanket the state, with no center handling more than 300,000 accounts. By February, 1959, the experience gained from the Fresno operation brought about a downward revision in requirements, and only five centers were found to be necessary.

Then, spurred on by rumors of a competitive system coming into the area, the installation program

The Dashew Electronic Databosser, a high-speed embossing machine, produces the Bankamericards directly from punched-card input, coding and embossing 600 cards an hour.

was again revised with the result that only three centers were needed, and the Fresno operation was eliminated.

Each Bankamericard customer carries an imprinted credit card which contains the normal identification information. In addition, the card has a nine-digit account number and a code indicating the credit limit for an individual purchase. The account number is printed in the type style that is applicable to magnetic ink character sensing, allowing for the eventual integration of the credit card program into the bank's MICR system.

Upon making a purchase, the customer presents the card to the merchant, who first determines whether the amount of the purchase exceeds the coded credit limit. If it does, the merchant dials a local number which puts him in contact with the control center handling his account.

The merchant gives the center operator the first six digits of the customer's account number and the operator switches the call to the proper "authorization" clerk. These clerks, wearing telephone headsets, are assigned sections of the huge punched card credit history file which is in account number sequence.

The cards are housed in special files which facilitate high activity reference, enabling a clerk to check a cardholder's current credit status in less than 30 seconds. If the cardholder's record happens to be located at another center, a Teletype is used for authorization. This takes about one minute. The files, made by Craig-LeFebure, are so designed that the cards can be removed for machine processing and then returned to their proper indexed position without disturbing the index guides.

Once the clerk has located the credit record of the customer in question she determines if the account is up-to-date, and if past payments have been made on schedule. If everything is in order, the clerk authorizes the sale by notating an authorization number on the history card, at the same time giving the number to the merchant. He, in turn, puts the number on the sales slip to prove he received authorization from the center for the sale.

Phonetically speaking

If there are irregularities in the account, the clerk refers the matter to her supervisor for a final decision. In some cases the merchant may then be instructed to simply deny the sale. Or, where an account is considerably delinquent, the merchant may be asked to retain the customer's card.

In addition to the history files, the center maintains a cross reference file which is indexed phonetically, using the last name of the customer. This file enables the center to locate the account number for those persons wishing to make a purchase but who do not have their credit card with them. As an example of phonetic filing, (the consonants are coded, vowels are not) the name Bronstein would be grouped with Bronston, Branstone, Birnstien and Bernstein, all under the phonetic category of "Brnstn". Within the group the cards are filed alphabetically by first name.

When the customer's purchase is authorized, as

View of the data processing room in the San Francisco Center, equipped with battery of IBM machines.

Cummins Carditioner "irons and conditions" punched card sales drafts, eliminating possible card jams in machine operations.

STATEMENT OF YOUR ACCOUNT

IF YOU WISH TO PAY YOUR ACCOUNT IN FULL PAY THIS AMOUNT

PREVIOUS BALANCE	TOTAL PAID ON ACCOUNT	TOTAL ADJUSTMENTS	SERVICE CHARGE	TOTAL OF CURRENT DRAFTS	CURRENT BALANCE DUE	WE OWE YOU

IF YOU WISH TO USE THE MINIMUM PAYMENT PLAN PAY THIS AMOUNT

ACCOUNT NUMBER	MINIMUM PAYMENT PAST DUE	MINIMUM PAYMENT FOR THIS MONTH	TOTAL MINIMUM PAYMENT	STATEMENT DATE

PLEASE KEEP THIS CARD FOR YOUR RECORD
PAYMENTS ARE DUE WITHIN 25 DAYS OF STATEMENT DATE

CHECK NUMBER _____ AMOUNT PAID _____ DATE _____

The punched card statement, pictured here, provides the customer with a complete record of previous month's activity.

well as in the cases where the purchase did not exceed the coded credit limit, the merchant writes up the sale on a specially designed "sales draft". This form, created by Moore Business Forms, has an original and two carbon copies, the second one being a regular 80-column IBM card.

Customer identification, such as account number and name and address, and merchant identification are transferred to the sales draft by placing the Bankamericard and draft into a specially designed Dashew Imprinter—leased by the merchant as part of the plan. In addition to automatic transfer of the identifying data, the imprinter is equipped with a device that allows for printing the amount of the purchase onto the sales draft, assuring an accurate and legible entry for the automated system.

At the end of the day's business the merchant prepares a transmittal record of all the day's charges and encloses it, along with the cards, in a deposit envelope. On the envelope's face the mer-

Continued on Page 40

memo

To the Programmed President:

By Carl E. Osteen

MR. PRESIDENT: It is a well-established fact that paperwork is assuming the lion's share of the cost of doing business today. While this is an area about which most executives know relatively little, there are those who do recognize its profit-eating capabilities and these men are looking for ways to arrest and combat the problem.

Many presidents have been fascinated by "programs" as a solution. Punched card programs long ago proved to be profitable consumers of expensive paperwork. Computer programs will someday undoubtedly reach the same well-entrenched position by proving they can do the job faster and cheaper. Today, programs of all kinds, shapes and sizes, such as "work simplification programs," "records retention programs," "work measurement programs," "equipment control programs," and last, but by no means least, "forms control programs" have edged in on the executive's reading and operating time as possible solutions for many administrative headaches and costs.

Properly administered programs have merit. There is much to be said for a forms control program when one considers that 75 percent of the total time of all clerical personnel is spent reading, writing, extending, handling, transferring, referring to and filing forms of one kind or another. The significance of a program of this kind is apparent.

What is "ungood," however, is the devilishly clever way administrators of the various programs, forms control programs in particular, can build up empires in their own sphere of activity and throughout the company. In some firms, usually the large ones, Mr. President, you or one of your top operating executives have been programmed into thinking that it is necessary to set up an elaborate forms control group in order to deal effectively with this very important segment of the total paperwork problem. Unfortunately, you may even have been convinced by some outside specialist who used charts, persuasive personality, attractive, custom-made dollar savings examples, and "let me relieve you of the headaches" routines to the point where you unwittingly let the forms control program build into an empire before it was even started. Even more unfortunate is the fact that you are probably paying a fantastic price for this.

Generally speaking, Mr. President, this problem is really no problem at all. It is admitted that forms should come under some kind of review by systems or other data processing planning groups. Because of this type of control, there is bound to be some measure of administrative headaches, paperwork volume, personnel training and supervision. But, any control program, any administration of a work effort in any area of the business, would require some degree of these problems.

Get the facts

On the other hand, a forms program can be set up by your own company personnel. Its administration and effectiveness need not be complicated, and the program can and should be "automated" just as any other paperwork data handling problem.

How can this be done? Just take the following ideas in their proper sequence and give them to the individual who will be responsible for administering the program. Ask him to develop the ideas. Some detail is spelled out here — not all. There should be enough here to point the way to the solution. If more than the requirements suggested here are proposed in your company's solution, then demand hard, cold facts—based on actual conditions—to prove why the program will not work with the minimum labor effort.

(1) First, Mr. President, you must be personally convinced that forms control, properly administered, can do a very effective job in the paperwork area in your company. You must make it known that you are behind the program. Don't do this on Form Letter No. 23 ("Insert 'Forms

Program' on line 4, Miss Jones"). You must put continuing enthusiasm and backing into the program.

(2) You don't need outside specialists. There are no mysteries about a forms control program that cannot be learned within a relatively short time.

(3) Don't decide that the forms program has to be in and operating by the "end of the month." If you have about 4,000 forms in the company, assign the task to a good systems analyst. Give him about 300 man hours to set up the program from scratch. Add time for normal secretarial duties plus the time that will be given by those supplying sample forms and other requested information. Allow a reasonable length of calendar time. Ask for progress reports during installation.

(4) Educate company personnel with a 10- or 12-page printed pamphlet which must list basic rules of form design and construction, paper quality, standard sizes, and a brief description of production processes. There must be one dramatic example of how costs can be materially reduced in each of these areas, preferably using examples of your own company forms (This won't be hard to find).

The pamphlet can be done very effectively by two teams working together. The company team might be representatives from the advertising, purchasing and systems departments. The other team may be selected from the paper, office equipment and printing salesmen who sell to your company. This pamphlet will not make forms experts out of anybody, it will give personnel a better grasp of how forms can solve systems problems on one hand and save production costs on the other.

Space is expensive

(5) Devise a file system. Devising and implementing the filing method will consume the major portion of original programming of forms control. This problem is complicated for several reasons. You may need to locate the file from only the form number or the purpose it serves. You may want to examine existing forms to see if they will serve the same purpose indicated by a request for a new form, or you may want to make several forms out of one if several will do a better systems job. You may want to bring together all of the forms which contribute to a particular data processing or systems cycle for a systems project study.

Filing systems can be expensive. Forms filing systems which require numerical files, functional

files, location files, type of form files, and the like all take space, time, money, clerical training and labor. If any proposed forms filing system requires more than one folder or file division for each form, it deserves a critical examination. Either your company has been "sold," or there is some evidence of empire-building, intentional or not.

The family file

How can you operate with one file? Arrange forms into systems families. *A Systems Family* is a natural, major division of key paperwork or data processing in the business enterprise without regard to current organizational structures or personalities and their peculiar responsibilities.

Examples of systems families are: accounts receivable, billing, capital asset accounting, order processing, payroll, purchasing and quality control. List systems families alphabetically. Assign a two-digit number between 10 and 99 in its proper order as the first two of four (or five) digits. In each family, number forms consecutively from 01. Follow the number with a date (the date identifies when the particular design and construction originated).

It is well to devise a somewhat scientific, but simple, method of numbering forms, Mr. President, because you may some day thoughtlessly order your forms people to put the forms program on punched cards or margin sort cards. The codes will make it easier for them to produce well-planned reports for you, Mr. President, but you are now contributing to the paperwork empire with very little return for your dollar.

In any event, the one-file system, the *Systems Family* idea, will not allow you to find forms by number, by what it does, by homogenous groups which lend themselves to review for combining, eliminating, comparison to new forms, and by practical groups which realistically allow you to work in any particular systems areas.

(6) Set up an automatic forms reordering procedure. After the program is in, don't review every form every time it is reprinted. Review it once. Thoroughly examine its relationship to the system. Evaluate the clerical processing cost—the real "pay dirt" area. Then forget it unless someone wants it changed. Reviewing all forms forever is just a device to keep someone busy in the forms control unit.

Time to stop thinking

Some forms must be watched closely. For example, if a systems study is under way, Purchasing should be signalled to reroute reprints in the study area to Forms Control. A few critical forms in any area might have to be watched on a weekly basis, even to the point of taking physical inventories regularly. Most forms, however, should be handled by Purchasing (They will have copies of specifications originally provided when the forms program was initiated).

(7) Let operating departments make up some of their own forms. Describe clearly and carefully the limitations under which this can be done. If you don't allow them to handle this, they will do it anyway. It is more profitable to set up an airtight control over typewriter ribbons and "Scotch" tape than on working forms originated by working employes.

(8) Don't set up elaborate inventory controls. Just watch the reorder quantity and keep one eye on the few critical forms. Don't keep records of every requisition. If the accounting system demands it, then change the accounting system. Nobody loses forms and nobody wants to take them home. Nobody can use them for any other purpose, so why account for them. If there is an exception, such as a company purchasing form for subsidiaries, then acknowledge the exception. Don't call it an exception just to perpetuate some "green eye shade" accounting technique.

Finally, Mr. President, think of forms as a very effective systems aid. Think of forms as the machine tools of your data processing factory. Then set up effective, economical, automatic forms control procedures and don't think about it at all any more. ■

About The Author

Carl Osteen is well-known both as a speaker and as an author in systems field. He has appeared before the American Management Association, International Systems meetings, the Office Executive Association of New York, and the Office Management Association in Detroit. He teaches two systems and forms courses at the New York University Management Institute, has been a guest lecturer at Rutgers University and is a consultant in the installation of forms programs. In the business world, he is an administrative assistant (Systems) for the New York Times.

An MBA Product Preview

New Honeywell Tape Drive–with 'Vacuum Touch'

The new magnetic tape drive is capable of reading or recording 96,000 decimal digits per second. It features an "all-vacuum" operation.

THE Datamatic Division of Minneapolis-Honeywell has unveiled a new high-speed magnetic tape transport, first unit of the Honeywell 800 transistorized data-processing system to be released for public demonstration. The tape transport reads or records information at the rate of 96,000 decimal digits per second. The information transfer speed of the unit is the highest of any such mechanism available with any commercial data-processing system, according to J. Ernest Smith, Datamatic vice president of engineering.

The Honeywell machine, using an all-vacuum drive as well as vacuum to hold the tape reel on its hub and the tape on the reel, will provide the most gentle tape handling yet achieved by the industry, Smith said. The vacuum system is expected to virtually eliminate magnetic tape damage and to substantially increase the life expectancy of tapes several fold.

The transport drives the tape 120 inches per second, in either direction, and is capable of reading or recording as many as 64,000 alphanumeric characters per second. It has a rewind speed of 360 inches per second. The system has almost instantaneous response to start and stop commands. It commences to move, on receipt of a command, in slightly less than one millisecond, and in 2.7 milliseconds is traveling at full speed. The tape moves substantially less than .3 inches on deceleration before it comes to a complete stop.

The tape transport is a compact unit standing only five feet, nine inches high and occupies a floor area slightly over two square feet.

Since the Honeywell 800 tape unit has no pinch rollers or idlers, only the mass of tape itself requires acceleration, thus minimizing the force transmitted to and by the tape. The tape accelerating forces applied by the vacuum drive are distributed over an area averaging 15 times greater than in mechanical systems.

Dirt embossing is virtually eliminated in the Honeywell unit, as the magnetic head is the only material body to touch the oxide surface of the tape during the reading or recording operations. At all other times the magnetic head automatically swings up and away from the tape.

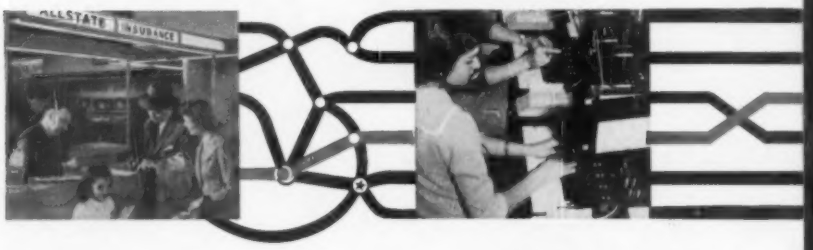
As the special reels use vacuum for attaching the end of the tape to the hub of the wheel as well as for attaching the reel to pneumatic mechanism, it is possible to make the reel flanges free of perforations, thereby providing the tape with an essentially dirt-proof and damage-proof container, as well as minimizing hazard to the operator of the equipment. Air lubrication of the tape is a built-in feature.

The tape mechanism will be standard equipment on the Honeywell 800 systems now being readied at two Boston area plants for commercial production, and delivery to customers will begin in October, 1960. Circle No. 1-20

A Statement from Allstate Insurance Company:

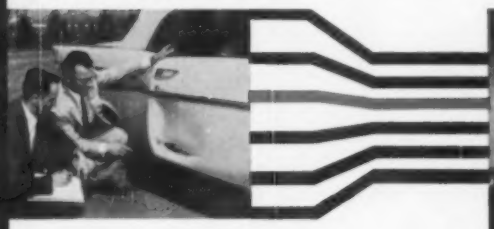
"We bought our first Burroughs computer in 1954, now own seven, and have more on order... these are big reasons why Allstate will continue to offer speedier customer service at low cost."

JUDSON B. BRANCH, *President of Allstate Insurance Companies*



James A. Reynolds, Vice-President of Allstate's Services Department (left) confers with Allstate's President, Judson B. Branch.

Back in 1930, the Sears Board of Directors considered the idea of applying Sears business methods to the sale of automobile insurance. They felt that by selling direct to the public, and keeping operating costs low, quality insurance protection could be sold at low rates. And by keeping customers satisfied through fast, fair service, they hoped to build and maintain a volume of insurance business that would make the low-overhead methods pay off. They settled on the name "Allstate" for the new company, and opened the first office in a Sears store in Chicago in 1931.



Since that time Allstate has had a dramatic rise in the insurance industry and has pioneered many new and more efficient ways of doing business.

In its first year, Allstate took in $118,000 in premiums through advertising in the Sears Mail-Order Catalog. In 1958, Allstate's volume had skyrocketed to a whopping $376,000,000. Today, Allstate is one of the world's largest stock companies offering insurance of almost every major kind. The company recently added accident and sickness insurance, and boat-owners insurance. Its comparatively new commercial insurance lines are booming. Allstate Life Insurance Company, a recently-formed subsidiary, already has over a billion dollars of insurance in force.

Allstate operates a vast network of zone, regional and district service offices in the United States and Canada, with foreign expansion now under way in Switzerland. At the present time there are more than 1,300 sales and service locations with more than 5,000,000 policies in force. One of the big reasons behind Allstate's growth is its dedication to customer service through fast, fair claim settlement, prompt response to inquiries, and lower premium costs. A powerful tool in aiding the company to provide swifter and better service is its use of Burroughs electronic data processing systems.

After a careful analysis of their needs, Allstate purchased a Burroughs 205 Computer, with magnetic tape equipment, in 1954. With the many complexities of insurance rating, endorsements, billing and coding, Allstate found the computer extremely useful in "cutting red tape" and speeding up policyholder service. More and more policyholders discovered that the protection they purchased through their Allstate policy was delivered promptly because the time consuming annoyance of manual handling was now replaced with electronic methods. Allstate also used the computer for statistical and management reports assembled in a fraction of the time formerly required.

Allstate's Assistant Vice-President and Head of Research, L. L. van Oosten.

In 1957 and 1958 Allstate purchased three more Burroughs 205's and used them for billing, accounts receivable, rating policy issuances, and endorsements. When Burroughs announced its large 220 System, with expandable core memory, Allstate purchased three of these and had them installed in 1959. More 220's are scheduled for installation this year.

In speaking of the over-all benefits to Allstate from its use of Burroughs Computers, Mr. Judson B. Branch, Allstate's President, said, "Primarily, we've been able to give our customers faster, more efficient service at much lower costs. The computers help us to 'cut red tape' and thereby speed our service and help us provide insurance at lower rates. They also provide us with a means of absorbing our substantial growth without a corresponding increase in our operating expenses. We've had other benefits, too. By developing vitally needed statistics, our computers have made available, on a regular reports basis, valuable up-to-date information for our management. In addition, they enable us to promote many of our present employes to positions of greater importance, productivity and interest."

In a company where efficient business methods have been a key factor in providing better service at lower rates, the cold eye of economic justification is constantly focused on its Burroughs equipment. A continual assessment and appraisal of its electronic data processing program has been made over the last five years.

As a result of its analysis, Allstate is not turning back, but relying on Burroughs for a continuation and expansion of its electronic data processing program.

There are hundreds of other commercial and industrial users doing the same. Burroughs' complete line of electronic computers is backed by a coast-to-coast team of computer specialists, all prepared to tell you how Burroughs can help you in your business. For additional information, write Electro-Data Division, Pasadena, California.

Burroughs Corporation *"NEW DIMENSIONS/in electronics and data processing systems"*

For More Information Circle Reader Service Card No. 1-63

SKF Tightens Control over Production Paperwork

The men responsible for SKF's new production control system are Charles T. Lloyd (left), supervisor of machine loading and statistical data, and James R. Miller (right), manager of production and inventory control.

CENTRALIZATION and automation of paperwork pertaining to production control at the SKF Industries, Inc. plant in Philadelphia has eliminated the human element of error in transcription of work tickets and put labor and machines to more effective use.

Some 14,000 pieces of paper in the form of shop directives, production cards, identification tags, assignment tickets, tool and gauge requests are required each day to route and schedule work through the shop and control inventory. James R. Miller, manager of production and inventory control for the ball and roller bearing manufacturer, initiated a method that permits this voluminous paperwork to be created centrally, in the Production Planning department, and then move out to the shop in pre-printed form with sequences established according to a scientific master plan.

The system devised is based on the use of a single "sequence" master, created on an Ormig Selective Data Printer duplicating machine, which produces all directives or job tickets, each describing a different operation and each containing certain information common to the entire job.

These pre-printed and pre-dated shop directives and tickets tell the shop just what to produce, when, and in what order. Products can be sequenced through the shop to meet the customer demands as outlined by management, and the shop personnel is always fully aware, in advance, of what management expects.

Under the system, as soon as a customer order comes in, it goes to the planning group in the Production Planning Department where a requisition is made up. This requisition, in turn, becomes the basis for the master which will be used to schedule the job through the shop.

Marked-sensed instructions

Before the master is created, Planning coordinates all standard data about the product. When initial operation instructions are received, the department mark senses on a punched card individual facts such as quantity to be manufactured, starting and completion date of job and order number. This card is then sent to the Data Processing department where a master sequence of operations for each type of job is on file. The job requirement card and this set of standard

Two Selective Data Printers turn out the 14,000 pieces of paper which are required daily to sequence jobs through the plant.

sequence cards are then matched and run through an IBM 407, resulting in the printing of a sequence master which can be used on the Ormig Selective Data Printer.

This master is returned to Production Planning, and here the Ormig machine is used to produce, in whatever quantity required, the orders, tags, cards and other papers needed to start and carry any particular job to completion.

The tags, cards and tickets are all pre-printed forms on which the master automatically enters data common to the entire job as well as data relevant only to a specific operation or component. This is possible because the Selective Data Printer can be set up to select one, two or three lines from the master in combination with the common heading and even though the lines may be widely spaced on the master, they appear on the smaller tickets or cards in condensed and contiguous form.

The production control system of shop directives and tickets was in use at SKF before the new method of centralized control was initiated. It worked, but it was dependent upon manual preparation at different points in the plant. This meant it lacked central organization, consumed both time and labor, and was always open to the possibility of error inherent in hand copying.

Only one piece of paper went to the shop—the shop order itself. This order indicated sequence of operations and the balance of the work in producing tickets and cards was left to the foreman and control clerks. Identification of parts, routing of parts from machine to machine, scrap notices and other directives were necessary to keep the product flowing through the production process, but each step relied on pieces of paper manually created on the line by clerks.

Foremen will be foremen

The inadequacies of this system were apparent to management, and especially to Mr. Miller. He wanted to achieve centralization, but he could not afford to sacrifice any of the detailed directives which are considered essential to the company's high standards of production.

The solution was the unitized master control form which can be reproduced in the form of tailer-selected parts without the need for additional manual transcription. With this in use, Miller lists advantages such as a tightening of jobs through the shop, elimination of backlogs and slow periods, and the important consideration that foreman now act as foreman. The burden of transcription work has been lifted from their shoulders and they follow a pre-set, day-dated sequence of operations.

The system, in conjunction with the efforts of the IDP department, has enabled production control to bring about a higher degree of efficiency in the utilization of time, labor and machines. ■

Navy Attacks Paperwork Costs on a World-wide Front

THE Navy has finally turned the tide of battle in its struggle against the mounting cost of paperwork, which now totals over $500 million annually. Applying a new technique, called Source Data Automation, to its world-wide information system, the Navy Management Office has been able to achieve some spectacular savings.

Source Data Automation is a Navy term for capturing or recording information in machine "common language" the first time this information is transcribed. For example, as the result of a sales transaction at a post exchange, the data required for later analysis would be automatically recorded at the time of the sale by means of a punched tape recorder linked to the cash register. The data becomes self-perpetuating and can be used over and over again to satisfy the requirements of the system.

Typical of savings reported so far from various SDA applications are reductions of from 50 to 90 percent in typing time, reduction of 75 percent in proofreading, 100 percent reduction in transmission errors, 90 percent reduction in processing time and in one installation an annual saving of $30,000 in personnel costs.

Basically, SDA uses adaptations of conventional office machines such as typewriters, adding, bookkeeping, calculating or addressing machines, coupled with punched paper tape, edge-punched or punched cards and punched tags. It also involves the use of tape-to-card and card-to-tape converters, communication and data processing equipment.

With data passing from machine to machine rather than from person to person or person to machine, the chance for errors and the need for tedious manual preparation and proofing of information is virtually eliminated. Machines, even of different manufacture, can communicate in a common language to provide the most efficient use of electronic data processing.

As any large business, the Navy found that paperwork constituted a major expense as well as a major problem. It had two main considerations in its initial attack on this problem. One was to cut the tremendous cost of paperwork necessary to maintain the vast information system. The other was to bring under closer control the problems associated with its extensive data processing system.

The $500 million annual paperwork cost is necessary to keep the Naval Shore Establishment and the Operating Forces in action. An immense volume of facts and figures has to be gathered, organized and reported for analysis and decision. Operating efficiencies depend upon how well the facts are prepared. Even with the large installations of machines and equipment, getting the information into useable form was costly and time-consuming. Much of the equipment was producing far less than actual capacity because of manual procedures. In addition, this manual intervention created the opportunity for errors at crucial points in the system.

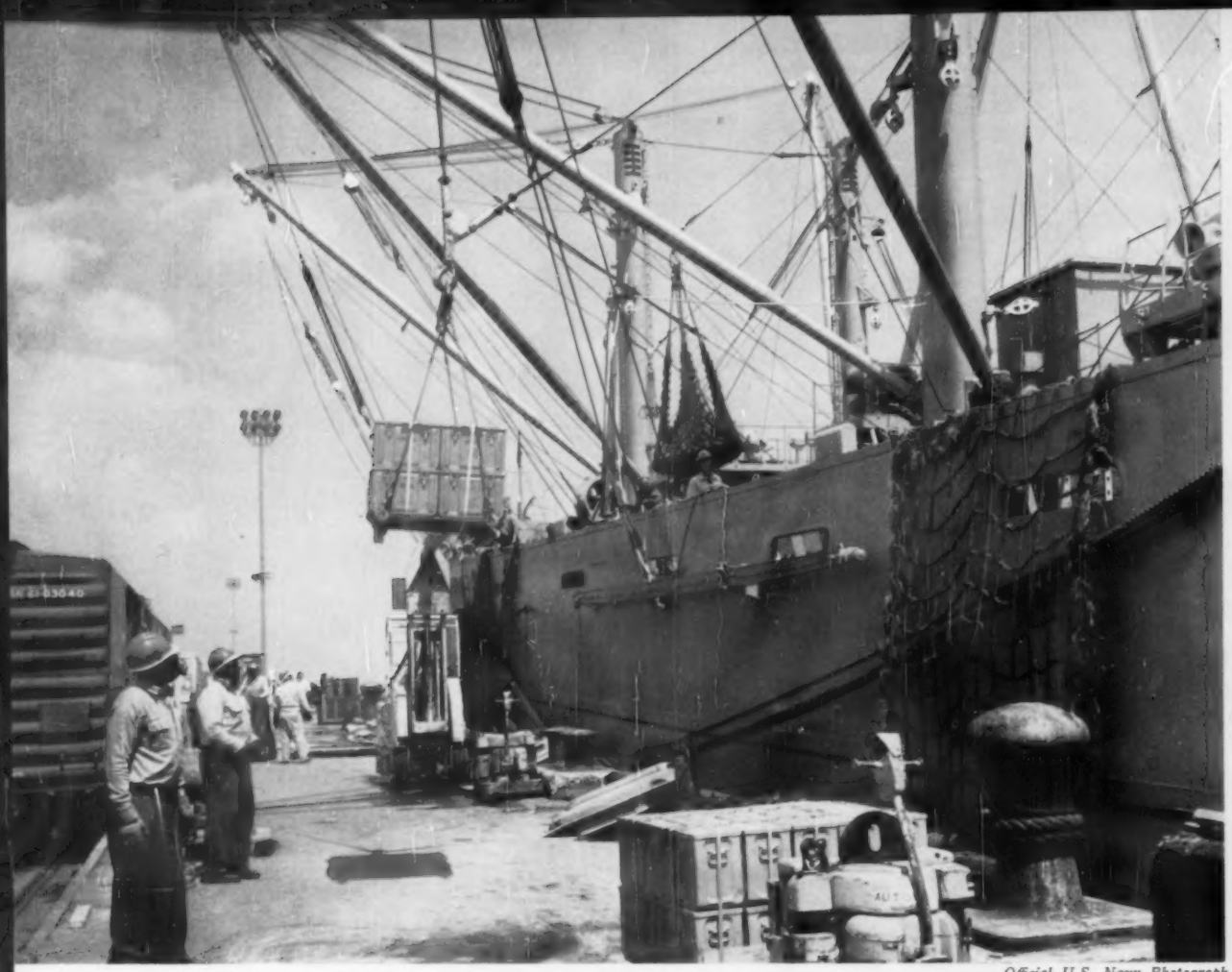
Constant data

In an evaluation of the conditions that existed, the Navy was faced with extensive repetition, a growing volume of work, missed deadlines, serious errors and frequent bottlenecks.

A comprehensive study proved that a large part of the data handled was constant—that is continuously reproduced from day-to-day and from document to document—such as the reordering of stock supply items, maintenance parts, fiscal data, or processing the same names and addresses, descriptions and similar types of information.

To initiate its SDA program, Navy management selected two analysts to undergo a comprehensive training program and act as the spearhead of the new program. Manufacturers of all equipment that might be used in SDA were contacted, and the equipment was studied to evaluate its limitations and capabilities.

It was also necessary for a complete systems



Official U.S. Navy Photograph

Loading ammunition at the Naval Ammunition Depot in Earle, N.J. SDA helps control the vital stock records for world-wide distribution.

analysis and purification to be made before any equipment was installed. This, in many cases, resulted in systems improvements which actually made SDA unnecessary.

This entire study program was initiated by the Navy Management Office as an integral part of the total Management Improvement Program of the Department of the Navy. It was decided that SDA would not be a specific part of any of the established functions, such as reporting systems, forms management, procedures analysis or data processing. Rather than have it become subordinated to any of these functions—where it could lose its effectiveness—SDA became a separate staff effort with its personnel working with all other management improvement groups.

It was found that many potential applications for SDA did not involve central data processing, but at the same time it was realized that a number of applications would eventually provide input data for the central processor and would, in fact, be a basic part of the total system. This brought about a close working relationship between the SDA group and the Data Processing Systems personnel. The relationship has produced excellent results and provides for complete coverage of SDA applications, with or without machine accounting or computer implications.

The Chief of the Navy Management Office also required a detailed plan and timetable for SDA. The plan called for indoctrination of management and operation personnel, detailed training for systems analysts and other personnel; installation of the system, and a focal point for the collection and dissemination of information on the latest developments in the SDA equipment field.

Aimed at the top

The indoctrination phase was very important. The first efforts were aimed at top management, with one-hour presentations designed to gain support for the program. The next presentations (of five hour duration) were made to systems analysts and operating personnel, the people who would have the job of finding applications and installing SDA. In all, the initial indoctrination reached over 3,500 military and civilian employes in 27 locations.

The next step was the detailed training courses

Some specific examples of SDA benefits include a 50 percent cut in typing time, a 90 percent reduction in processing time, and in one area, an annual saving of $30,000 in personnel costs.

which were first offered in March of 1958 and have been held continuously since with more than 10 completed. This method of internal recruitment was and is directed toward selected and experienced personnel who are considered to be in a position to put into practice the training received. Today, the Navy also has periodic one-day refresher courses for former students to brief them on the latest developments and equipment applications.

SDA in action is proving to be very effective. There are applications in procurement, accounting, naval personnel, contracting, progress reporting, stock replenishment and production and time control.

Three of these areas, stock control, civilian personnel and supply, offer a diversified view of the system in action.

Ammunition stock recording at the Naval Ammunition depot is an excellent example of SDA in a useful role. The physical handling of ammunition presents a problem due to the potential danger of accidents. Strict control is necessary and this has led to a rather elaborate control system.

The depots are large in size, covering acres of ground, to keep the ammunition magazines widely dispersed. Consequently the initial paperwork processing is widely decentralized. This meant that document preparation resulted in repetition, bottlenecks and errors.

Ammunition control

To speed up document preparation, two automatic typewriters are now used in the Ammunition Distribution and Control Division to prepare the receipt and issue documents. An Ammunition Data Card is contained in each round or container of ammunition. These cards contain the detailed description of the contents. It was necessary to prepare 6,000 master edge-punched cards to cover all of the types of ammunition at the depot, and in turn these cards hold the information on the data cards as well as the constant data.

When ammunition is received at the depot, the data cards are collected and forwarded for magazine space assignment. They are then matched to the pertinent edge-punched cards and the typewriters automatically prepare the documents with the exception of the manual entry of quantity received and space assigned. A copy is sent right with the ammunition as it is stowed in the magazine.

In preparing issue documents, an edge-punched card is pulled each time a requisition is received. This card is given to a typist who prepares the issue document automatically, making only the quantity and space location entry by manual methods. The issue document is then sent to the field for filling the order.

Two valuable by-products have come from this system. One is a punched paper tape from which a listing of daily transactions is automatically prepared, and the other is a tape for conversion to punched cards to satisfy the requirements of the central Ammunition Stock Recording Office.

next month . . .

New Role For the Systems Man

Analysis, though still of great importance in the systems job, has become a secondary skill. For continued effectiveness the systems man must adopt the role of a "synthesist."

•

Electronic Data Processing At Niagara Mohawk

Customer accounting for 1,400,000 electric and gas customers is the EDP project of Niagara Mohawk Power Corp.

Official Marine Corps Photograph

Completely automated check-out system at Marine "Self Service Center" utilizes charge plates and tape-punching cash register equipment.

Once this system is developed for all depots, the Navy expects to realize additional benefits. These include the conversion of the data card into a machineable document, the exchanging of by-product tapes for inter-depot transfer of ammunition, the provision of tapes for direct input to the Bureau of Ordnance computer, the provision of by-product tapes for automatic preparation of other related documents at the depot, and a more responsive and less costly ammunition stock recording system.

Marine Super Market

Another application for SDA is in the U.S. Marine Corps "Self Service Center." This operation parallels the general layout and procedures of a retail supermarket. Items are picked from self-service racks and shelves by Marine "customers" and brought to a check out counter. Here the Corps personnel present a charge plate similar to those used in commercial operations. This holds unit name, number and other identifying information. It is presented to the sales personnel at the counter and inserted into cash register type equipment connected to a paper tape punch.

The operation of the cash register in conjunction with the paper tape produces a necessary receipt for the customer and at the same time records all pertinent data for fiscal administration. The tape is processed through a tape-to-card converter where the information is interpreted into a punched card which in turn is the basis for the preparation of reports on inventory, appropriation and expenditure data and total dollar value of sales. The expenditure information is used by the Fiscal Office to post obligations and liquidations to the ledgers of the respective customers.

The Navy sees this program providing a more rapid, efficient and economical supply support on a retail basis. The time factor in the issuance of material has been changed from days to an hour or less, and the cost to issue material has been drastically reduced.

Key to better systems

Personnel paperwork processing in the Navy is an understandably voluminous operation. For each personnel action that occurs, e.g., appointment, separation, promotion and transfer, there must be a notification to the employe and to a number of action offices. This entails the completion of a multi-part form, posting to several records and keypunching on a punched card for payroll purposes or for reports.

In the Crewing and Receiving Section at the Military Sea Transport Service, Atlantic Area, the processing of personnel actions consumes more manhours than any other operation. There are some 3,000 actions each month for 4,000 employes. Approximately 90 percent of the data typed on the action forms is of a repetitive nature.

Automatic, card-reading typewriters were selected for this job. This equipment can be controlled by punched paper tape, can read punched cards, produce a card as a by-product and produce an additional by-product in the form of punched paper tape.

When an operator receives the change report, she (1) withdraws from files a card pertaining to the individual requiring a change, and (2) a punched paper tape pertaining to the ship he is on. Then, (3) she feeds this machine language into the equipment to produce a completed personnel action form. At the same time, by-products are automatically produced—a new card for Personnel's needs, one for Payroll, and a punched paper tape for statistical reports.

By recording information at its point of origin, and in a manner that will serve all subsequent processing steps in the entire systems cycle, the Navy has achieved true automatic data processing. Benefits from the SDA program include savings, accuracy, speed and better information, leading to a new Navy Management slogan, "SDA—The Key to Better Systems and Procedures." The benefits are so convincing that every office, large or small, might well consider the feasibility of its own program of Source Data Automation. ■

A Comprehensive Look At High-speed Printout

By Norman Statland

AS solid-state design and other technical advances measurably increase the speed of electronic computers, the industry is faced with the problem of developing equipment which can get information into and out of the computer at speeds that are compatible with the system.

To match the output of the modern computer, manufacturers are developing high-speed printers of the impact variety and searching for even faster methods—now centered on the non-impact variety.

In the early days of computer utilization, the single-action character printer was fast enough to do the job, especially for scientific use. Large amounts of data were fed into the machine, and computations were large—but output was limited.

With the advent of business use, circumstances changed. Large amounts of data were fed into the machine and computations were relatively small—but now the output is voluminous. The solution was to record data at high speeds on magnetic tape and then, in a separate "off-line" operation, feed this data into the various impact printers.

The speeds of these printers vary from 10 characters per second to almost 1,800 lines per minute. They print by means of mechanically driven typebars, similar in operation to the adding machine. This equipment has been doing the job, but impact printers are pushing their electro-mechanical components to the limit. There is a definite capacity limit which has been reached on mechanical equipment.

Non-impact printers, both those available today and those in the development stage, are promising to do the job faster and at the same time compete favorably in cost with impact equipment. These units imprint an image by electrical charges which are then developed by chemical means, or they record an image displayed on a television-like tube by photographic means.

Printed on the fly

Most high-speed printers in use are of the impact variety. Table I summarizes the operation of some of the units offered. A late development in the field is the IBM 1403, a line printer designed to cope with the paper check handling problem. It is marketed as part of the 1401 system which includes a main frame core memory of up to 4,000 characters, a card reader and card punch.

This printer will operate at speeds of 600 lines per minute for alpha-numeric information and 900 lines per minute for numeric information. In addition it can feed blank paper at 75 inches per second. It is a marked departure from the matrix impact printers of the Type 720-730 variety to an on-the-fly actuated hammer printer. It is ca-

About The Author

As a staff member of Arthur D. Little, Inc., Cambridge, Mass. research and engineering company, Mr. Statland has participated in major data processing feasability studies and methods evaluations. Prior to joining the ADL organization, he was senior methods analyst for a large casualty insurance firm and served as a senior member of the training staff of a major computer manufacturer.

TABLE I

Available High-speed Impact Printing Equipment

Vendor	Speed	Cost	Type	Features	Comments
Burroughs	900 lpm—alphabetic 1500 lpm—numeric	6500/mo.	On-The-Fly Type-Drum	1. Buffer Storage 2. Selectivity 3. Editing 4. 130 ch/line	4 carbons
IBM 720 A	500 lpm	4900/mo.	Matrix	1. 120 ch/line	1. Needs special format on tape. 2. 4 carbons 3. Poor printing quality.
Honeywell (Analex)	900 lpm	3550/mo.	On-The-Fly Type-Wheel	1. 120 ch/line	1. Edited tape is needed. 2. 3 carbons
RCA (Shepard)	600 lpm—alphabetic 900 lpm—numeric	4000/mo.	On-The-Fly Type-Wheel	1. Selectivity 2. Editing 3. 130 ch/line	6 carbons
Remington Rand	600 lpm	3300/mo.	On-The-Fly Type-Wheel	1. Selectivity (limited) 2. Editing 3. 130 ch/line	1. 6 carbons 2. *Needs low density (128 ch/in) tape input. 3. Most proven printer in the field.
NCR (Used with GE 150 System)	600 lpm—alphabetic 900 lpm—numeric	4250/mo.	On-The-Fly Type-Wheel	1. Selectivity 2. Editing 3. 120 ch/line	1. 6 carbons 2. Untested as to field performance.

*Magnetic-core-buffer available which permits use of high density (250 ch/in) tape.

pable of printing 100-132 characters per line obtained from a magnetic storage drum.

In Table II, a list of current non-impact printers is revealed. Most of these are well under development or have been put to limited use or field tests. Many of them will be installed in the field during 1960. It must be said that in some cases non-impact printing is poorer in quality and in many cases it cannot produce multiple copies.

Among the new non-impact printers is the Burroughs "electrostatic" which operates at ultra-high speeds. The technique was previously called "electrographic".

The electrostatic printer can reproduce full characters or numerals, dots or solid lines through a device that has no moving printer parts. It utilizes a controlled source of electricity to form small charged areas on a surface such as coated paper. This charged paper is passed through a dry ink bath then over a small hot plate that fixes the ink permanently.

Applications of the technique are under investigation by the Army, Air Force and the U. S. Weather Bureau. The Army is working with a model called BETA as a member of a family of high-speed communications equipment. Beta runs at speeds of 750 words per minute, but Burroughs has demonstrated speeds from 750 to 3,000 words a minute. It has been further demonstrated in the research lab that the printer can run at 4,200 lines a minute and produce better printing copy than at slower rates. The major problem is passing paper through the machine at this speed.

Right now this equipment is not available for civilian use, but it does hold promise for the near future. It is tape fed which means it will be able to print out computer results at speeds equal to that of the computer operation.

Burroughs has a wide-line page printer in the planning stage which is expected to have a paper speed of 72 inches per second and the ability to record data at a rate of 45,000 characters per second.

Use of the Charactron

Stromberg-Carlson Division of General Dynamics Corp. has developed two series of high speed printing devices. Both the S-C 4000 series and the S-C 5000 series make use of the Charactron display tube—a display device similar to the television tube. Inside the tube an electronic gun shoots an electronic beam through tiny, openings which form the beam into characters.

The S-C 4000 series are microfilm printers which print on-line and off-line at speeds up to 15,000 characters per second and up to 10,000 graph plotting points per second. Applications in-

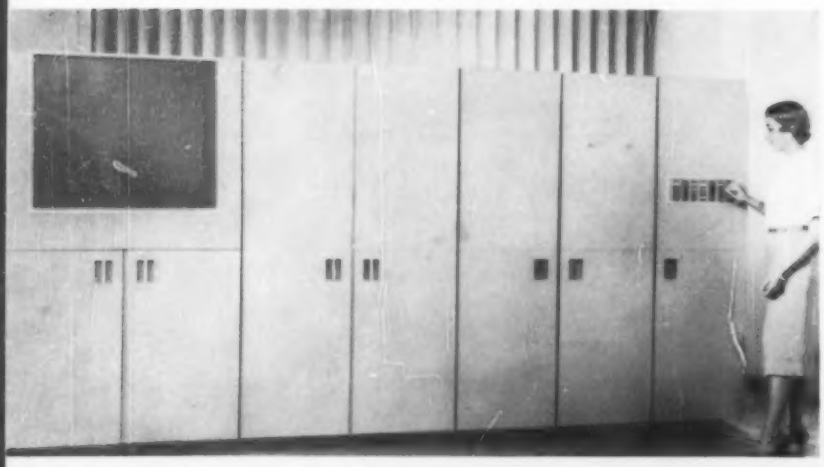
Burroughs "electrostatic" printer, pictured at the left is being field tested by branches of the military. The Stromberg-Carlson 5000, pictured above, is credited with speeds nearing 5000 lines a minute.

TABLE II

Developments in Non-impact Printing

Vendor	Name/(Type)	Speed	Estimated Purchase Price
Burroughs Corp.	Electrostatic	5000 ch/sec. or 4200 lines/min.	$50-85,000
Stromberg-Carlson	S-C 5000 (Xerographic)	10,000 ch/sec. or 4,680 lines/min.	$150,000
	S-C 4000 (Microfilm)	15,000 ch/sec.	Unknown
IBM	(Microfilm)	3,000 lines/min.	$250,000
A. B. Dick Co.	Videograph (Electrostatic)	20,000 ch/sec.	$235,000
National Cash Register General Electric	(Ferromagnetic)	5000 ch/sec.	Unknown
Eastman Kodak Co.	DACOM (Microfilm)	15,000-90,000 ch/sec.	$200,000

The S-C 4020, pictured below, is a microfilm printer which prints on-line and off-line at speeds up to 15,000 characters per second. The A.B. Dick "Videograph" printer, at the right, uses an "electro-static printing tube" to convert video-like signals into a printing record at speeds up to 20,000 characters a second.



clude graph plotting, tabular printing, design engineering and computer monitoring.

S-C has delivered a 4020 to the Navy at David Taylor Model Basin in Carderock, Md., where it will be used in the plotting of ship lines, the display of potential flow patterns and other problems. The film output contains tables of data and computed results.

Another S-C 4020 has recently been sold to Convair Corp. for use by the Air Force at Wright-Patterson Air Force Base in Dayton, Ohio. It will be used for readout and display of data with a Control Data Corp. 1604 computer.

Videograph is versatile

The S-C 5000 is a high-speed unit which incorporates the Charactron display tube with the Xerox printer, a product of Haloid-Xerox, Inc. This printer converts the shaped beams of light from the display tube into permanent records on untreated paper. Alphabetic, numeric and symbolic characters may be printed at speeds approaching 5,000 lines per minute. The paper used can be a continuous roll, pre-printed forms, or even lithographic masters.

Another system utilizing the television-like display tube is "Videograph", an electronic printing process capable of printing characters, figures and symbols at the rate of 20,000 per second. Videograph is a development of the A. B. Dick Co. Heart of this unit is a special display tube called the "electrostatic printing tube." This converts video-like signals into a printing record or visual display on a TV screen. When augmented by an electronic device, called a "character generator," the Videograph can translate computer language, magnetic tape, punched paper tape or punched cards and either print or display the translation.

Printing is accomplishd by scanning the displayed characters with an electromechanical unit and transmitting a signal to the printing device, which in turn deposits a charge on ordinary paper. The charge pattern is "developed" with a powder and becomes affixed to the paper.

Needles on a drum

In two units contracted to Time, Inc., a tape reader and a buffer unit will edit information from magnetic tape. The buffer unit will have storage space for 2,184 characters and will also be able to retain static data in a special 144 character magnetic storage unit.

In the development stage is a "Ferromagnetic" printer, a project jointly conceived by General Electric Co. and National Cash Register Co. This printer is said to feature a helical track of needles arranged around the surface of a drum. A magnetic field places the image on the paper by energizing selected needles. The image is made visible by exposure to a ferromagnetic powder attracted to the magnetized portions of the paper. Heat is applied for affixing the characters to the paper. Speed is expected to be about 5,000 characters per second.

International Business Machines Corp. has produced a new electronic microfilm printer for the Social Security Administration which converts data coded on magnetic tape directly to printed, readable records on 16mm. microfilm at rates of more than 3,000 lines a minute. Each line contains 120 characters. In this unit, coded information read by the tape equipment is extracted by a printer control unit which translates it to alphabetic and numerical characters positioned on the face of a cathode ray tube. This tube, also similar to the TV picture tubes used in other systems, flashes the characters to the microfilm output printer where the microfilming operation takes place.

Control characters can be included in the tape record for skipping, spacing, print suppressing and paging. This allows selective pick-up of information.

This microfilm printer can handle the entire printing task required in the earnings listing application at the Bureau—1,200,000 lines a day—in less than an eight-hour period.

Impact for the moment

Dacom, or Datascope Computer Output Microfilmer, is the latest offering in the field by the Eastman Kodak Co. This new recording system has present speeds up to 15,000-16,500 characters per second, limited only by the input tape drive. The device can, however, be modified to accept other tape and it is expected that speeds up to 90,000 characters a second will be possible.

Dacom has been designed to cope with the high output of computer data. Like other cathode-ray tube display devices, this system displays letters or numbers on the face of the TV-like tube, and these characters are photographed by a special camera. It is possible to simultaneously display and photograph various format lines and markers.

Non-impact printers aim at delivering computer output at speeds comparable to the computer itself. Obviously, the cost of this equipment runs high because most of the units are still in the development stage. For the present, the impact printers will probably remain as the most economical for normal data processing operations.

But, there is no doubt that the rapid strides made in developing non-impact, high-speed print out will soon bring these new concepts within economic reach of the smallest installations. ■

Koppers' Centralized Payable System Controls 70 Plants

AN accounts payable operation, handling some 20,000 invoices a month for 70 far-flung plants, is accomplished with maximum control and a minimum effort at the central office of Koppers Co., Inc. in Pittsburgh.

The company operates seven divisions comprising chemicals and dyestuffs, plastics, engineering and construction, gas and coke, metal products, tar products and wood preserving. A streamlined system produces hard-copy ledger records for information and audit and, at the same time, punched cards as a by-product for detailed analysis. By using a typewriter-bookkeeping machine coupled directly to a card punch machine, one operator can produce all accounts payable records in a simultaneous step.

Koppers' Treasurer, E. B. Shuck, points to the installation as part of his company's "continuing search" for better ways of handling conventional record-keeping. It was the first in Pittsburgh which links National Cash Register's Class 31 typewriter-bookkeeping machine to an IBM 024 Card Punch by means of the new Systematics "intercoupler." Four of each unit were integrated into the Koppers system.

Purchase orders originate either in the Pittsburgh procurement office in the local plant or in a division office. All invoices, however, go directly to the plant from the vendor. At the plants, these invoices and receiving orders are matched with the purchase order. Every bill passed for payment receives an invoice "sticker" which is a transaction form on which plant personnel fills out the accounts payable information at the time the invoice is approved for payment.

The invoices and attached stickers are then sent to Pittsburgh where extensions and totals of the bills are checked. A clerk also computes the cash discount and net amount payable on each invoice.

In the next step an accounts payable clerk reviews the account numbers of the invoices, determines the date payment is due, inserts this data on the sticker, sorts in alphabetical order and then puts the invoices in due-date sequence by vendor's name. At this point an adding machine tape is run off for each batch, showing the net amount payable. This tape is rubber-stamped with information headings to be filled in, such as division number, beginning and ending serial numbers and the first due date. Space remains on this tape strip to indicate that cards have been punched and the information verified.

In the last step before the bills go to the bookkeeping machine, the clerk checks an alphabetical file of voucher checks to see if one for the vendor is pending. If one is there, it is sent to the machine operator along with the invoice. If none is in the file, a check voucher is first prepared before the invoice moves out.

At the bookkeeping machine, the operator posts the invoices to the individual check vouchers and an invoice register. This invoice register is the hard-copy ledger record. In Koppers' case, whole-dollar accounting is used for posting distribution, and the register has a column at the far right which controls this accounting procedure.

Sizeable savings

Totals of postings on the machine must balance with the adding machine batch tape, and when this is correct, punched cards are automatically created as a by-product of operating the bookkeeping machine. There is no extra effort required of the operator. There are approximately 45,000 punched cards created for the 20,000 invoices each month, averaging out to a little more than two items per bill. These cards are obtained without the extra step of verifying, necessary in conventional punched card systems.

The cards for distribution go to the tab room for sorting by account number; detail cards are listed with totals for each account. The detail listing is the source media for posting ledgers, which is handled by a conventional Class 31 machine.

Bills and checks go to an auditor who verifies that all postings are correct. The checks are returned to a tub file in the bookkeeping department,

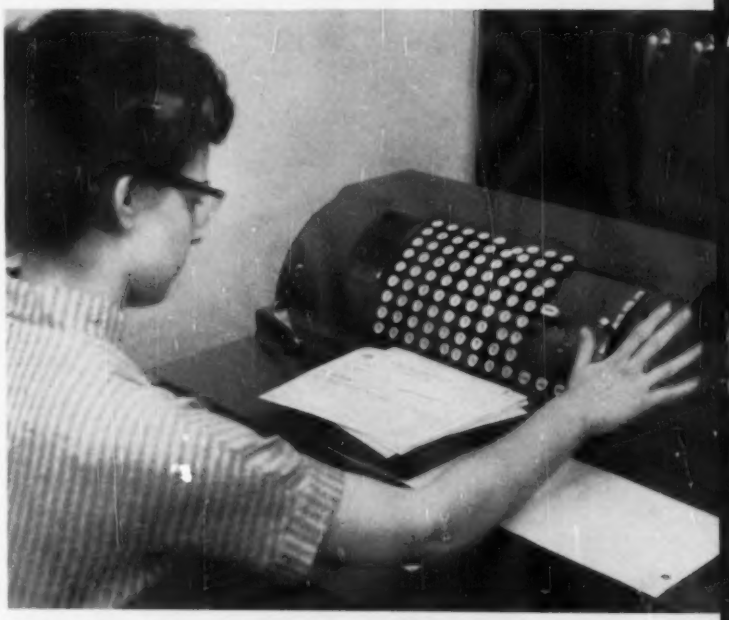
As operator posts payable invoices to check and register, an Intercoupler links the NCR machine with keypunch, providing instant punching of cards for distribution analysis.

and the bills go to the originating department where they are filed alphabetically.

Each day a clerks selects checks that are due from the tub file. These are completed on an NCR Class 2000 checkwriter and then audited once more to verify that the amount shown on the voucher stub is the same as the amount on the check. After this the original copy is mailed to the vendor; a yellow copy is filed alphabetically; and a pink copy is filed by check number to be used for reconciliation when checks are returned from the bank.

Mr. Shuck explained that Koppers previously used a conventional unit-ticket accounts payable plan. The savings which result from eliminating handsorting of unit tickets has been sizeable, he pointed out, and the equipment utilized can be handled by a bookkeeping machine operator with only a few minutes of instruction. Another plus value, in his estimation, is that Koppers has developed enough "know-how" in installing and operating the two-machine "intercoupler" system in accounts payable to extend it to other accounting applications within the company.

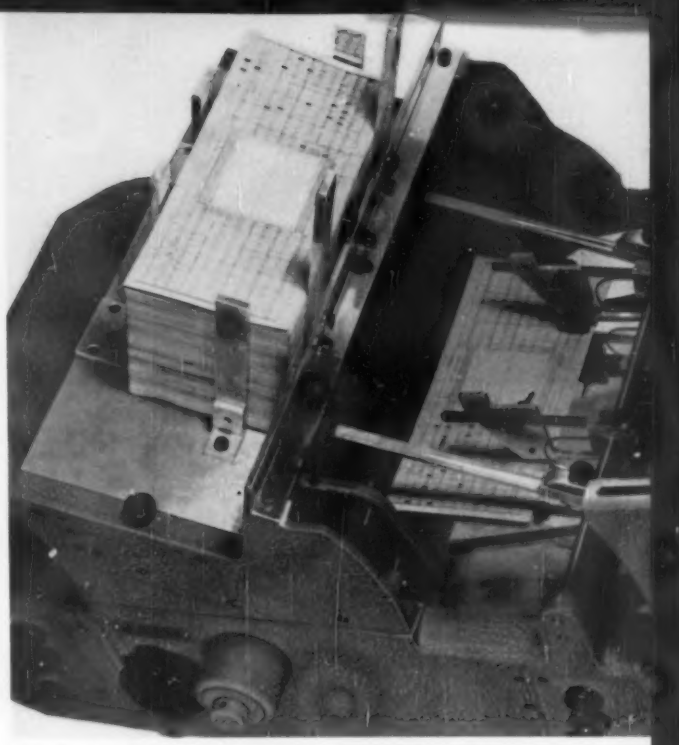
The system has the toughness and simplicity to stand up under day-to-day use, yet it is delivering maximum information and maximum control in the by-product form of punched cards. ■



Checks are filed in tub file by due date. On date of release they are completed by operator on this NCR Class 2000 checkwriter. Final check is audited against total amount accumulated on voucher as a result of invoice posting.

Bankamericard

Continued from page 21



Punched card inserting station of Friden inserting machine. Bank is working with Friden device that will sense corner cut of cards and automatically feed sales drafts behind customer name and address card.

chant totals the dollar volume of sales, deducts the six percent bank "withold", or handling charge, and posts the net total.

The envelope is sealed and delivered to the nearest Bank of America branch; an operation requiring little effort on the merchant's part, as some 663 branches are at his service.

At the bank, the teller stamps the envelope as a deposit and immediately credits the net amount to the merchant's account. The bank groups all envelopes for the day and processes them through an internal clearing system which charges the proper control center with the total of the deposit. The envelopes are then forwarded to the center.

Each morning the center checks the envelope totals to the clearing system cash controls, and at the same time the calculations on each envelope are proved. The envelopes are then opened and the contents checked for errors and omissions. The sales drafts are microfilmed on a Recordak machine, since the originals will eventually be returned to the customer. The envelopes and sales drafts then move to the keypunch department. The customer account number and amount of purchase are punched into the sales draft cards. Merchant identification, gross, withold and net amount of purchases are punched into a "merchant card". This card is used later to determine quarterly sales activity for each merchant—a factor in computing the amount of the six percent withhold to be refunded.

A tribute to simplicity

Both sets of cards move to the center's IBM unit for balancing and further operations. The sales draft cards are merged into a "current unbilled" activity file prior to preparation of the customer statements.

Customer billing is done on a cycle basis. There are 10 billing periods during the month, one every three days. Customers are distributed among the cycles alphabetically, based on the first letter of their last names. The three-day cycle maintains an even work flow for all departments and eliminates the peak-load headaches so common to many automated billing operations.

The Bankamericard's customer statement is a tribute to simplicity; nothing is left to the customer's imagination, except perhaps, how he will raise the necessary funds. One line of the statement indicates a summary of the prior month's activity and the balance due. A second line indicates the amount involved if he wishes to apply the option of the minimum payment plan. (See card, page 21.)

The reverse side of the statement card lists a schedule so that the customer, in planning his future credit requirements, can determine the minimum payment due under the flexible payment plan.

Along with the statement the customer receives the original sales drafts and a card to be returned with his remittance. The latter is pre-punched with date, account number, total balance due, and the minimum payment due. This information virtually eliminates any manual operations in the accounts receivable operations except in cases where payment amounts do not agree with the remittance card.

The entire statement package is microfilmed before mailing to the customer, giving the center a permanent record of all transactions.

Due to the high degree of automation, the speed of the entire billing system is such, that if a customer makes a purchase three days before his cycle billing date, the item will appear on his forthcoming statement. The customer's appreciation of the plan's efficiency is pretty well indicated by the fact that an average of 85 percent are paying their accounts within the 25-day period; avoiding any interest charge. The interest charge is 1.5 percent per month of the unpaid balance.

The bank is constantly striving for more efficient use of automation in all areas of the Bankamericard program. There is considerable interest in the

Joseph P. Williams, vice president of Customer Service Research, who has directed the Bank of America's automation program, including the famous ERMA project.

possibilities of MICR but this awaits the development of a carbon paper that will give the proper magnetic qualities to the imprint on the sales drafts. Another possibility—which would eliminate the carbon problem—is the use of optical sensing equipment.

Leadership from the West

The Customer Services Research staff is also seeking some improvement in the operation of inserting machines. At present the inserting equipment (Bell and Howell at L. A. and Friden at S. F.) is used mainly for gathering literature and credit cards for new customer mailings. The research people have developed the idea of an inserter that will sense the corner-cut of the detail and draft cards, automatically place them behind the proper customer's name and address card and then insert the package in the envelope.

Another requirement for complete automation of the inserting operation is a device, which will "read" the statement card and automatically insert the correct "reminder" notice, depending on the degree of delinquency. The Friden laboratories are busily engaged on these projects.

Bankamericard has set a pattern for similar bank credit plans, not only in California, but across the entire nation; leadership in which Bank of America officials can take justifiable pride. As Mr. Williams sums it up: "The intelligent use of expanded credit means an expanded economy. The extension of credit is part of America's way of life. The presence of major banks in this picture will provide the dignity, and intelligent management which we need to keep our economic equations in balance." ■

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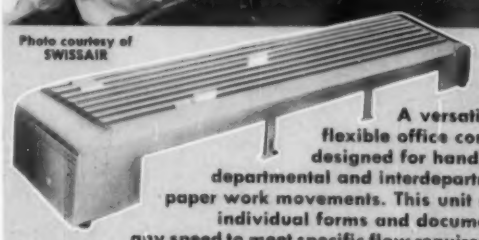
The MERCURY "OFFICE" CONVEYOR

Photo courtesy of SWISSAIR



A versatile and flexible office conveyor designed for handling of departmental and interdepartmental paper work movements. This unit moves individual forms and documents at any speed to meet specific flow requirements

Executives engaged in time study, methods, systems or procedures are invited to write for Bulletin No. 500.

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MBA Showcase

New Products

for

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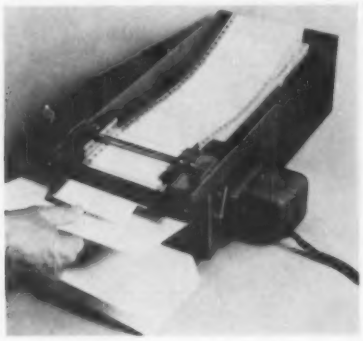
Pin-feed Label Dispenser

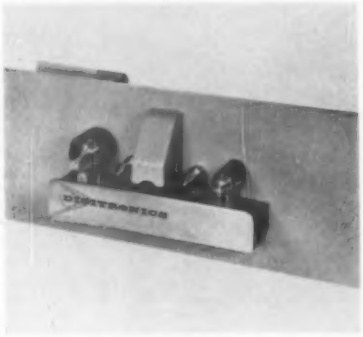


A high-speed dispenser for pressure-sensitive pin-feed labels has been developed by Allen Hollander Co., Inc. The Able-Stik two-way dispenser can deliver labels, ready for application, without moistening, heat, glue or other preparation. Labels which have been imprinted on data processing equipment from existing input data can be applied to various forms at speeds up to 3,000 an hour, it is stated. The unit handles both fanfolded flat packs and rolls and be can used for die-cut labels as well. Circle No. 1-11

Mobile Filing Truck

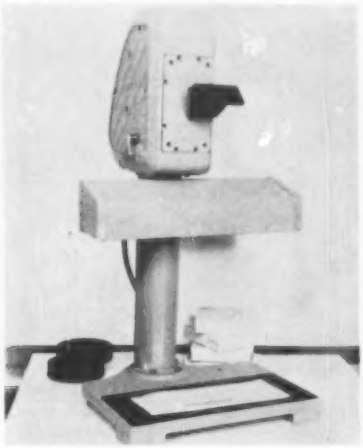
A mobile, self-contained work station for use with shelf-filing units has been announced by Remington Rand Div. Called a "Mobile Shelf Filing Truck", the unit enables an operator to handle correspondence both to be filed and to be pulled from shelves as one combined operation. It also provides a mobile, one-step platform to aid in reaching the top shelves. The truck seals to the floor when in use. Circle No. 1-19

Punched Tape Reader



The Model 3500 Dykor photoelectric reader, designed by Digitronics Corp. to meet the requirements of digital computer input, machine tool control or ground support equipment is a completely solid-state unit which handles 5, 6, 7 or 8-level tapes interchangeably. It has a unique featuring of stopping before each character while reading at speeds of 1,000 characters per second. This was made possible by a design which essentially eliminates mechanical motion. Both dual and single speed units operating at 100 to 1,500 characters per second are available. Circle No. 1-13

Microfilm Recorder



A simplified microfilm recorder, said to cost less than any unit now available, has been introduced by Regiscope Corp. of America. The portable unit weighs 20 lbs. and is 25 inches high and 12 inches wide and deep. It was designed primarily for offices and banks where compactness and simplicity of operation are paramount requirements. There is no focusing by the operator, and a touch of a lever records the document. Circle No. 1-5

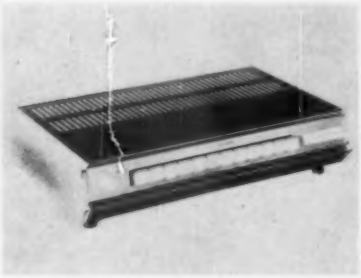
Check Signer

Average speeds up to 5,000 checks an hour are claimed for the new Burroughs T-141 Controlled Facsimile Signer produced by the Todd Co. division. The unit is equipped with a locked vault in which signed checks are deposited and has a non-resettable meter that counts the number of documents signed. It prints in any combination of two colors and can reproduce pictures (halftones). Accepts documents up to 6 by 9 inches in size. Circle No. 1-1

Offset Duplicator

New units of the Addressograph-Multigraph line of Class 1250 duplicators provides user with a 35 percent increase in image capacity. The 1250W will reproduce impressions up to 10½ inches wide and 16½ inches long on full 11 by 17-inch paper stock. Letter-size forms or bulletins can be run two on a sheet at speeds up to 15,000 per hour. The 1275W, a tandem unit, is utilized for the production of four-page 8½ by 11-inch folders. Operation is the same as previous models. Circle No. 1-7

Intercom System



A new, all-transistor "Chief" intercommunication system has been announced by the Talk-A-Phone Co. The Chief lies flat on the desk and is less than three inches high. It has, as standard features, a monitoring signal which visually indicates to a non-private station that it is being monitored; an incoming call chime; an external relay control for use in extremely high noise level areas; and a reciprocal power supply for use where no electrical outlet is available. Private and non-private masters and staffs and busy signals are standard equipment in the new series. Circle No. 1-12

Tape-to-Tape Converter

A tape-to-tape converter for data processing systems which can read any channel punched paper tape, convert punched paper tape to magnetic tape at speeds of 200 characters per second, and convert codes through a "pluggable matrix," is offered by Raub Electronics Research Corp. The "Recoder," as it is called, also transcribes and converts on a "one for one" basis, automatically filters out or replaces invalid codes as required (with a set signal) and can establish any code structure and reads punched tape photo-electrically. It is designed to handle a direct one-to-one conversion of intelligence from a punched paper tape to a magnetic tape. The "pluggable matrix" is designed to enable the user to change codes from the paper tape to magnetic impulses with complete flexibility. The units are custom-engineered into each installation to meet all requirements. Circle No. 1-16

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For More Information Circle Reader Service Card No. 1-46

Accounting Machine

A full, 21 separate totals are available on the new Class 33 accounting machine introduced by National Cash Register Co., with automatic credit balances obtained from all 21 totals. The machine can be programmed to affect as many as four totals in one operation, and the depression of a single key automatically totals or subtotals all 21 in sequence. The Class 33 has removable program bars which can be altered to meet accounting job requirements. It has a built-in electric typewriter or is available without typewriter. Circle No. 1-3

Rotary Card Indexes

A redesigned line of rotary card indexes, including the Executive series Model No. E-124 shown here, is being marketed by the Cardway Corp., division of Cushman & Denison Mfg. Co. Capacities of the "Whirl-O-Dex" units range from 250 to 3,000 cards in three sizes. As a new feature, cards for units are not pre-mounted but are packaged to eliminate the necessity of removing them from the unit for posting. Six color choices for cards are available, and all are punched for interchange between units. Circle No. 1-8

R-W Console Searches and Displays Computer Data

A control and display console, which enables anyone to operate a computer and which interprets data in non-technical language, has been introduced by the Intellectronics Laboratories of the Ramo-Wooldridge division of Thompson Ramo-Wooldridge, Inc.

The R-W Analysis Console, as it is called, can be connected to any data processing system. Through the use of a simple keyboard arrangement, operators may control the computer and demand a display of data, either in graphic or in understandable, printed form on the console's video screens.

This means the individual need not be familiar with the technical computer code since he can search the computer in his own language and receive the answer in his own language.

As an example, in a bank loan application, the R-W unit could provide the loan officers with rapid access to all loan data in the computer's files. The officer would be able to run a complete credit check on the applicant. This information would then be displayed on the screen of the console.

Other suggested applications include weather forecasting, stock market analysis, inventory control, sales forecasting and production scheduling. Circle No. 1-6

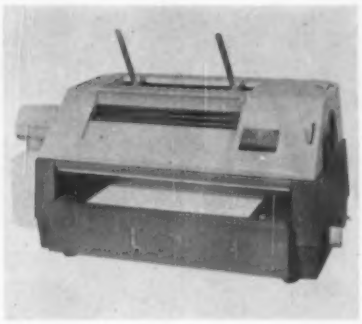
Paperwork Conveyor

The "Hy-Clip" paper conveyor is a new, lightweight system that picks up and delivers paper forms to predetermined stations. Office personnel place the paper in a unique clip traveling on an endless, constantly moving conveyor. The clip moves to a pre-selected desk or station and the paper is automatically ejected. The conveyor moves easily around corners or between floors. Any number of stations can be accommodated on the system. The conveyor is tailored to individual specifications by the Barry Hyman Co., Inc. Circle No. 1-18

Stencil Dispenser

The Model "200" desk-top dispenser by Weber Marking Systems, Inc. is designed to make tabbing on invoice forms a quick and easy task for the office worker. It requires only the pressing of a lever to get the "Tab-On" stencil ready to go on single set or continuous forms. This eliminates the inconvenience of opening packages or removing backing paper. After tabbing, forms and stencils can be prepared with customer's address simultaneously on any typewriter or other data processing equipment. Circle No. 1-17

Photocopy Machine



The A. B. Dick Co. has announced its new and improved all-purpose photo copying machine, the Model 110. The new machine can copy originals from opaque, two-sided or transparent paper—white or colored, heavy cardboard, individual sheets or pages in books. According to the company, the unit will make copies of anything printed, duplicated, typed, written, drawn or photographed in black or in colors. The machine is 25½ inches wide, 10½ inches deep and 10 inches high. It weighs 31 lbs. Circle No. 1-10

Royal Unveils the RPC-4000 System

A new, transistorized general purpose digital computer system designed to serve both business and scientific data processing needs has been announced by Royal Precision Corp., jointly owned by Royal McBee Corp. and General Precision Equipment Corp.

As a general purpose computer, it can handle engineering applications as well as such business problems as inventory control, payroll and sales analysis. As many as 17 input-output devices —or 60 with modifications—may be connected on-line to the system.

The RPC-4000 is scheduled for first deliveries in July, 1960. Rental is $1,750 a month, and selling price is $87,500. Circle No. 1-14

New Disc Transcribing Unit by Gray

The Gray Key-Noter Secretarial, a disc transcribing instrument designed especially for use by secretaries, lays claim to being the smallest and lightest transcriber on the market.

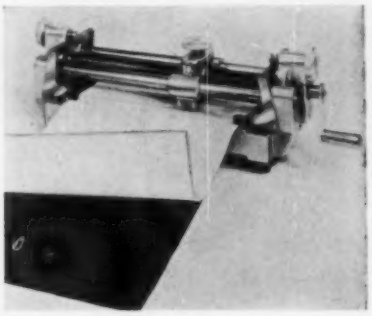
The unit is the latest addition to the Gray Audograph line of dictation instruments and is a twin to Gray Key-Noter executive dictating machine.

The instrument is transistorized and features a complete fingertip control over the system. It has indicator lights which show corrections and instructions. A fingertip dial allows the secretary to scan the entire disc in one second, and a pointer shows exact location on the record at all times.

Star, stop, repeat, speed, tone and volume controls are located with convenience and flexibility of operation in mind.

The company claims full-voice fidelity for the transistorized unit and offers a choice of several listening devices for single and double-ear use that will not muss secretary's hair. Circle No. 1-15

Letterhead Die Impressor



Designed to eliminate the need for costly printing of letterheads for mimeographed work, this letterhead die impressor can be used to impress a letterhead in the same stencil on which bulletins, announcements or price lists are typed. The manufacturer, Print-O-Matic Co., Inc., states the device consists of a photo-engraved etching of any letterhead design in tool steel and a special pulsating roller die impressor. They say any operator can produce a letterhead in a stencil that will provide perfect reproduction. One "trip" over the die plate cuts the stencil. Circle No. 1-4

NEWS

WU Begins Public Facsimile Service

"Wirefax," a transcontinental public facsimile service linking New York, Chicago, Washington, D.C., Los Angeles and San Francisco was recently put into operation by Western Union. The service makes it possible for business, industry and the public to send full-page documents, letters, drawings and other recorded data at transmission rates of from $2 to $4 for four inches minimum. Everette B. Harris, president of Chicago Mercantile Exchange, left, is pictured here as he sent the first message from Chicago to New York. G. P. Little, general manager for WU, was on hand for the inauguration ceremonies.

OEME Names Cities For Business Exposition

Rudolph Lang, managing director of exhibits for the Office Equipment Manufacturers Exhibits, Inc. has announced a tentative schedule of cities which will be visited by the traveling Business Equipment Exposition.

Los Angeles was unanimously endorsed at the annual membership meeting as the exposition city for 1960. New York City is the site selected for the 1961 show, Detroit in 1962, Atlanta or Dallas in 1963, and the World's Fair location in 1964.

The next Business Equipment Exposition will be held in Los Angeles on November 1-4 in the Memorial Sports Arena.

Farrington Acquires English Company

Farrington Mfg. Co. has acquired Adrema Limited, a 38-year-old United Kingdom manufacturer of business machines and systems.

The acquisition was reported to be a cash transaction, but no purchase price was disclosed. The move, according to William Tetrick, Farrington president, strengthens his firm's position in the data processing field by broadening its range of business machines designed to create input media.

Adrema maintains sales operations in 55 countries, manufacturing the "Bradma" line of addressing, listing and plate embossing machines and mailing equipment as well as business and storage systems. It has two subsidiaries.

EJC Conference Hears Russian Computer Progress

Russia is rapidly closing the gap on America's computer lead, according to Dr. W. H. Ware of The Rand Corp. Addressing some 2,500 computer scientists and engineers who attended the Ninth Annual Eastern Joint Computer Conference in Boston.

Dr. Ware said that much of the Soviet's-progress is due to the pioneer efforts in the computer art by the United States, which the Russians have copied. However, he added, there is no evidence of transistorized machines; their best computers are comparable to our latest commercial vacuum tube machines. Dr. Ware was a member of the delegation sponsored by the National Joint Computer Committee, which visited a number of the Soviet's research institutes, universities and digital computer factories in 1959.

The three day meeting, held at the Hotel Statler-Hilton, featured a number of technical papers and panel discussions, including the keynote presentation, "Computers of the Future" by R. Rice, of IBM. Rice predicted that special purpose machines "for more economical on-line real use" will gradually replace the general purpose systems now prevalent.

General Chairman of the 1959 Conference was F. E. Heart of Lincoln Laboratories. Over 60 exhibitors participated in the show.

MBA Now Available On Microfilm

Back copies of MANAGEMENT and BUSINESS AUTOMATION magazine are now available on microfilm.

The microfilm is furnished on metal reels, in positive form, suitably labelled. Inquiries should be directed to University Microfilms, 313 N. First St., Ann Arbor, Mich.

Alden Shows "Secret" Facsimile Transmission

A new facsimile system, using recording paper from which the message disappears immediately after recording to reappear at a given time later in all its original fidelity, has been demonstrated by the Alden Electronic and Impulse Recording Equipment Co., Inc.

The demonstration was conducted for Post Office and International Telephone and Telegraph engineers at the Alden Research Center, Westboro, Mass. The "magic" recording paper allows transmissions to be received directly on the recorder, then processed into envelopes prior to the message reappearing, so that only the original sender and the recipient would see the message.

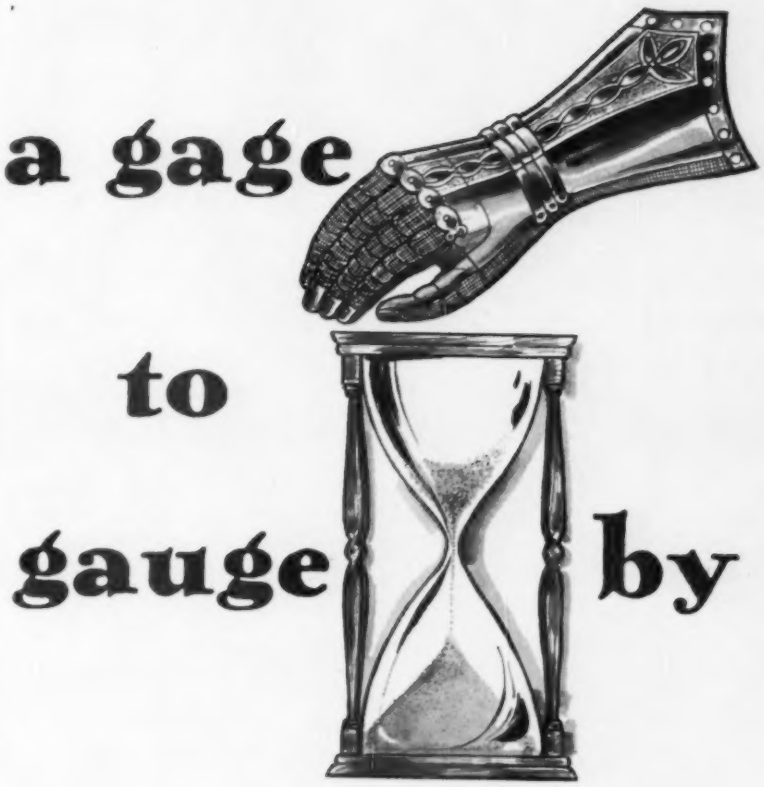
According to Milton Alden, chairman of Alden Electronic, the new paper can eliminate many of the security precautions now visualized as necessary in order to maintain privacy of the mails at the receiving end. "This startling development has tremendous implications in solving the basic problem of maintaining the secrecy of facsimile mail that may be sent by the Post Office," he said.

Fred Vogel Named MBA Eastern Editor

To further increase the growing editorial coverage of activities in the important East Coast and Mideast area, MANAGEMENT and BUSINESS AUTOMATION has named Frederick G. Vogel to the post of Eastern Editor.

Vogel was formerly associate editor for Andrew Geyer-McAllister, Inc., New York publishers of monthly trade magazines in the business field and was a staff reporter for the Washington Post newspaper.

He is the author of many articles on electronic data processing and related topics for business and financial publications and newspapers. He also served as a lecturer on office automation at Columbia University, and for some time he acted as a free-lance reporter for the monthly journal of the New York chapter of the Systems and Procedures Association of America.



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Copies On Request

The following booklets, catalogs and brochures are considered of interest to readers of MANAGEMENT and BUSINESS AUTOMATION. Copies can be obtained by using the convenient Reader Service Card and circling the corresponding key numbers.

Flow Chart Planning Kit—Offered free by Tab Products Co., this kit consists of a folder containing pressure-sensitive stickers of standard flow chart symbols, as well as instructions next to the charting area inside the folder. The stickers can be moved at will without hurting the final chart. Circle No. 1-25

The 1604 Computer—A new brochure released by Control Data Corp. fully describes the new transistorized computer system, including explanation of registers and installation requirements. Circle No. 1-26

"Modern Mailing through Mechanization."—A new brochure from the Bell & Howell Phillipsburg Co. presents a detailed picture of just how the Phillipsburg inserting and mailing machine operates. Circle No. 1-27

Portable Stitcher—An illustrated specification sheet describes a new portable sticher by Thomas Collator Industries, Inc. The unit becomes fully automatic when used with the Rotomatic or Gathermatic collator. Circle No. 1-28

Argus Assembly Manual—The assembly language of "Argus," the automatic routine generating and updating system for the new Honeywell 800 electronic data processing system has been embodied in a new manual. Circle No. 1-29

"Automation Labelation" — A new kit and case history brochure by Allen Hollander Co. is the first in a series describing more than a dozen case histories of applications in different industries. Circle No. 1-30

Installment Payments — New equipment in the Perf-O-Data system by Cummins-Chicago Corp. is described in a four-page bulletin entitled "For you . . . and your customer." It covers equipment for installment loans, club plans, mortgage payments and planned savings. Circle 1-31

Univac Service Centers—A six-page folder explains how Rem Rand Univac Service Centers are being utilized by businesses which do not have punched card and electronic equipment. Circle No. 1-32

"Tomorrow's Security Vault"—A descriptive brochure describing how security vaults are equipped to labor-saving work areas is available from Wassell Organization, Inc. Equipment described includes mechanized coupon clipper and rotary filing units. Circle No. 1-33

Partition Catalog—An eight-page, full-color reference guide to movable partitions is now available from the Workwall Division of the L.A. Darling Co. Circle No. 1-34

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MBA's Calendar

January 31-Feb. 5—American Institute of Electrical Engineers 1960 Winter General Meeting in New York.

February 1-3—AMA Workshop Seminar in New York. Installing and administering electronic data processing systems. Write American Management Association, 1515 Broadway, New York 36, N.Y.

February 1-4—ISA (Instrument Society of America), Conference on Instrument-Automation. Rice Hotel, Houston, Tex. Exhibits at Sam Houston Coliseum. This is first of three such meetings this year.

February 3-5—1960 Winter Convention on Military Electronics, Biltmore Hotel, Los Angeles. This meeting is sponsored by the Institute of Radio Engineers.

March 21-24—IRE National Convention. In the Coliseum and Waldorf Astoria Hotel, New York City.

March 23-25—Career Management Conference Clinic sponsored by the National Machine Accountants Association, Chicago, Conrad Hilton Hotel. Contact Ken Iles, P.O. Box 1620, Chicago 90.

April 18-19—Third Annual Conference on Automatic Techniques, Cleveland-Sheraton Hotel, Cleveland, Ohio. Jointly sponsored by the ASME, AIEE and IRE. Write J. H. McRainey, Room 530, 1213 W. 3rd St., Cleveland 13, Ohio.

May 2-6—The 1960 Western Joint Computer Conference, San Francisco, Calif.

May 22-27—41st International Conference and Annual Exposition of the National Office Management Association. Queen Elizabeth Hotel, Show Mart, Montreal, Canada.

June 22-24—National Conference and Business Show of the National Machine Accountants Association, San Francisco, Calif. Mark Hopkins and Fairmont hotels and California Masonic Memorial Temple for exhibits. For information, write P.O. Box 3617, Rincon Annex, San Francisco 19.

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EDITORIAL

A Challenging Pace

Reflecting on developments in the business automation field during the past year, the mind recalls so many exciting and important highlights that it becomes no easy task to select the most significant one. All things considered, our vote for the most important event would have to favor the dramatic breakthrough in character recognition. (See MANAGEMENT AND BUSINESS AUTOMATION, March issue.) This new technique has brought about an entirely new concept of data processing: providing a means for introducing source data into a system directly from the original document.

The initial impact of character recognition was directed mainly at the banking industry, opening their doors to automation at a time when they were all but submerged under the huge paper "tidal wave"—that is still to reach its crest. The banking applications have centered around magnetic ink character recognition, but other industries have been having much success with optical scanning.

It is the latter technique that we feel offers the greatest potential to banks and other businesses alike, and you can expect to hear announcements along this line from at least three of the major equipment manufacturers in the very near future.

Perhaps one of the greatest benefits of this new concept will be the enforced standardization of basic business forms. We can foresee optical sensing bringing about an era, not only of common-language, but also of common-forms. This will complete the loop of business automation: high-speed printed output becoming high-speed printed input, without any intermediate conversion steps. The months ahead will probably find many such examples in operation, especially in utility and credit card applications.

Right now it appears as though character recognition will continue to hold the development spotlight in 1960, as far as high-speed data processing is concerned. But without a doubt, there will be many other significant contributions. The real challenge of these fast moving events, as we see it, is for management to gear its thinking, and operations, to a pace compatible with the product developments.

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